



F
1563

U53

1903

~~SECRET~~

CONFIDENTIAL.

For the sole use of the officer to whom issued.

WAR DEPARTMENT, OFFICE OF CHIEF OF STAFF.

SECOND (MILITARY INFORMATION) DIVISION.

GENERAL STAFF.

No. I.

NOTES ON PANAMA.

Compiled and arranged by

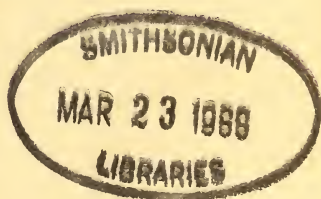
Capt. H. C. HALE, General Staff.

November, 1903.

WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1903.



WAR DEPARTMENT,
OFFICE CHIEF OF STAFF.
Document No. 217.

TABLE OF CONTENTS.

	Page.
I. HISTORICAL SKETCH	5
II. GEOGRAPHY, PHYSICAL AND DESCRIPTIVE	11
(a) Area and boundaries of country	11
(b) Discussion of the general geography	11
Mountain ranges	11
River system and lakes	13
Climate	15
Fauna	21
Flora	22
(c) Coast line	23
General description, bays, gulfs, peninsulas, capes, adjacent islands, soundings, harbors, anchorages, light-houses	23
Ports, breakwaters, jetties, docks, wharves, loading and discharging facilities, coaling facilities	143
(d) Statement of cities	149
Name, population, location, description and characteristics	149
(e) Lines of travel and communication	164
Canals	164
Water transportation	174
Roads	179
Railroads	185
Cables	195
Telegraph	195
III. POPULATION	196
(a) Census and distribution, race, language, religion, character, morals, manners, mode and cost of living, habits, health conditions, etc.	196
IV. RESOURCES	203
(a) Mineral resources	203
(b) Timber and fuel resources	205
(c) Animal resources	206
(d) Products and manufactures	206
(e) Revenues	208
Taxes, exports and imports	208
V. MISCELLANEOUS INFORMATION	210
VI. APPENDIX	219

NOTES ON PANAMA.

I. HISTORICAL SKETCH.

“Alonso de Ojeda landed on the Isthmus of Panama in 1499. Later on the Spaniards found many warlike Indian tribes there. Eight principal tribes are enumerated. Those in Darien were specially troublesome.

“Columbus visited the port of Chagres and the bay of Limones in 1502. Having heard of the mineral riches of Veraguas he made the first attempts at colonization on the banks of the Belen. The renowned mineral wealth of the Isthmus attracted many navigators, and it was given the name of Castillo del Oro (golden castle).

“The warlike and intrepid natives fought heroically to preserve their liberty, and there are to-day over 10,000 natives who still preserve their original wild independence.

“In 1510 Diego de Nicuesa brought a large expedition to Panama and was appointed governor. He founded the city of Nombre de Dios, which was sacked and burned in 1595 by English freebooters. In 1546 Christopher Peña came with 130 men to settle the territory, but accomplished nothing. In 1513 Balboa, who was in command at the Isthmus, organized an expedition of 190 Spaniards and 1,000 Indians, which ended in the discovery of the Pacific.

“Owing to complaints made against Balboa, an expedition of 2,000 men was sent from Spain in 1514 under Pedro Arias Dávila (called Pedrarias), who succeeded Balboa. Pedrarias sent people to settle the Pacific coast and founded the city of Acla. He had Balboa beheaded in the latter place in 1517.

“In 1521 Pedrarias transferred the seat of government from Santa Maria la Antigua del Darien to the village of Panama.

It may be said that the conquest ended with the transfer of the government to Panama, for Darien was abandoned with the conviction that it was impossible to conquer it, and the remainder of the territory presented no obstacles. The ports of Chagres and Panama, with the Cruces road, were thus opened to traffic between the two oceans.

“Owing to the famed riches of the Isthmus and its exceptional geographical position it was a target for the attacks of pirates for about one hundred years, which greatly disturbed its commerce and industry.

“The following towns were sacked or burned at different periods: Portobelo, Santa Maria la Antigua del Darien, Nombre de Dios. The castle of San Lorenzo was destroyed. Finally Panama, the wealthy and populous capital, was sacked, burned, and destroyed by the pirate, Henry Morgan.

“In 1699 William Paterson, a Scotchman, sailed with 1,500 men to establish a colony in Darien. He bought land of the Indians and settled at Acla, calling it New St. Andrew and the adjacent country New Caledonia. The colonists immediately began to improve the port of Acla, or Puerto Escoces, as it is called to-day. They opened a canal and erected a fort, in which they mounted 50 guns; they also erected a house on a mountain overlooking the port, from which they commanded a long view and could guard against surprise. This colony, being refused recognition or assistance from the Spanish Government, was soon without resources, and the majority died of hunger. A few reenforcements subsequently arrived, but they were attacked by a Spanish force of 1,600 men, three months later, and finally defeated. Of the remnant of the colony but 30 souls eventually returned to Scotland alive.

“Under Bolivar the Republic of Colombia gained its independence of Spain in 1819, and was officially constituted December 27, 1819.

“At the time when the South Americans rose in arms against Spain and proclaimed their independence Panama was divided for administrative purposes into two provinces, Panama and Veraguas, each ruled by a governor.

“While New Granada, Venezuela, and Quito were struggling for their independence, Panama, owing to its lack of resources and its strategic position, had to patiently await the result without participating.

“The English expedition under General McGregor, which arrived at Portobelo in 1819, might have hastened the emancipation of the Isthmus had not McGregor remained at Portobelo and allowed himself to be surprised by the Spaniards. The result was fatal to the Isthmus, as it led the Spaniards to double their vigilance and increase their garrison.

“However, its hour was approaching. In 1821 part of the garrison (700 to 800 men) was taken by the governor and captain-general of Granada to Quito, leaving four companies of troops in Panama, under Lieut. Col. José Fabriga, at the time governor of the province of Veraguas.

“The Panamanians believed the hour of independence to have arrived. The first cry was raised in the village of Los Santos; then the capital followed. The movement was immensely popular and no bulwark could stay it. On November 28, 1821, the ayuntamiento, boldly risking the consequences of such a step, convoked all the military, civil, and ecclesiastical bodies in a general assembly, in which it proclaimed the independence of the Isthmus from the Government of Spain and adhered to New Granada.

“In 1826 the Latin-American Congress was held in the city of Panama. It was participated in by Colombia, Central America, Peru, and Mexico, and a treaty of coalition, providing for the furnishing of a certain annual military contingent by each country, was concluded, but never ratified by all the Governments.

“In 1830 José Domingo Espinar, commander in chief at Panama, usurped authority and assumed the title of civil and military chief, declaring the government of the Isthmus independent of that of the Republic of Colombia. This condition lasted three months, when the usurper himself decreed that the original régime be restored. He continued, however, as a dictator, but became so tyrannical that he was finally superseded by Col. Juan Eligio Alzuro at the instigation of the commanders of the garrison. Espinar was exiled to Guayaquil. Alzuro retained military command of the garrison, and quiet was restored for a while. He, however, soon began to act arbitrarily, and on July 8, 1831, he called an assembly and proposed the independence of the Isthmus from the central government. The motion was unanimously defeated. But the Venezuelans, expelled from Ecuador, ‘who

expected to make the Isthmus their inheritance,' incited Alzuro against those who opposed him, and he called another assembly, from which, by intimidation, he wrested a declaration that the Isthmus should be a state independent from the Government of Colombia. The assembly appointed him supreme military commander, and Gen. José de Fábrega civil chief.

"Colonel Herrera then began to collect forces against Alzuro, who then also assumed the civil authority, deposing General Fábrega and exiling him and other prominent citizens, with admonitions never to return. They did, however, return, and began inciting the population in Darien to insurrection against the tyrant. Finally, on August 24, a desperate struggle took place between Alzuro on one side and Herrera and Fábrega on the other. Alzuro was defeated and taken prisoner, and he and his counselors were shot. The executive power approved the conduct of Herrera and expressed words of praise to him for his services in the campaign."—*Directory of Panama, 1898.*

The vast Republic split up into Venezuela, Ecuador, and the Republic of New Granada February 29, 1832.

The same year a conspiracy headed by two officers again attempted to overthrow the constituted government. They failed and were executed. Comparative quiet followed until 1840, when a revolution, with Herrera at the head, was instituted, independence was proclaimed and for two years maintained. In 1842, however, Panama again submitted and returned as a province of New Granada.

An important treaty was concluded between the United States and New Granada December 12, 1846, guaranteeing, among other items, equal commercial privileges on the Isthmus of Panama to citizens of both contracting countries. In order to secure constant enjoyment of the advantages accruing to the United States in this treaty and as compensation for these advantages, and in order to secure unembarrassed transit across the Isthmus, the United States guaranteed to New Granada neutrality of the strip and the rights of sovereignty and property then possessed over the Isthmus by that country.

Grievances preferred by foreigners have in numerous instances strained the relations between the National Government and the powers, and the neglect of the Government to

afford safe passage across the Isthmus finally became so flagrant that in 1854 a protest signed by the consuls of several powers, including the United States, Great Britain, and France, was addressed to the governor of Panama. It was not till after 1859, when the President of the United States asked Congress for power to protect Americans on the Isthmus, that the more serious causes for complaint disappeared.

Except for some minor disturbances in the provinces of Aguero and Veragua in 1854, comparative peace prevailed in the Isthmus from the revolution of 1840 to 1856.

In 1855 Panama, under a liberal constitution, became a State of New Granada. The executive authority was vested in a governor. The outlook for the future appeared hopeful, but from this time forward the Isthmus became afflicted with constant conflict; revolution became a habit.—Authority consulted, *Bancroft, Native Races, vol. 8.*

“The constitution of April 1, 1858, changed the Republic into a confederation of eight States, under the name of Confederation Granadina.

“On May 8, 1863, an improved constitution was formed, and the States reverted to the old name of Colombia—United States of Colombia.”—*Commercial Relations, 1900.*

“After the great civil war of 1861, generally known as the Mosquera revolution, the sixth constitution of government was framed and adopted. It changed the name of the country from New Grenada to the ‘United States of Colombia,’ disestablished the church, confiscated nearly all church property, and disfranchised the clergy, but extended the suffrage to all other male persons 18 years of age and upward.

“This constitution remained in force for about twenty-two years, and during that time there were as many as eleven ‘revolutions,’ or one on an average of about every two years.

“After the hopeless failure of the armed revolt against the Nuñez administration, in 1885, another constitution was framed and adopted, making the seventh in chronological order within a period of not quite fifty years. This last constitution changed the name and title of the country from the United States of Colombia to that of ‘The Republic of Colombia,’ thereby intending to convey the idea that a consolidated republic had been substituted for a confederation of ‘sovereign states.’”—*Scruggs, The Colombian and Venezuelan Republics, 1899.*

“The insurrection which began in October, 1899, was ended on November 22, 1902, the fleet and war stores of the insurgents being restored to the Government.”—*Commercial Relations with the United States, 1900.*

Discontent born partly of the failure of the central government to pass the Hay-Herran canal treaty resulted in November, 1903, in the separation of Panama and the establishment therein of an independent republic.—(*Compiler.*)

II. GEOGRAPHY, PHYSICAL AND DESCRIPTIVE.

(a) AREAS AND BOUNDARIES.

“Panama is bounded on the north by the Caribbean Sea, west by the Republic of Costa Rica, south by the Pacific Ocean, east by the Department of the Cauca.

“The area of Panama is 32,380 square miles, of which only about one-half is inhabited. Its greatest length, from the Darien Range to that of La Cruz, on the side of Costa Rica, is about 420 miles. The widest part of the Isthmus lies between the mouth of the Escribanos River, on the Atlantic side, and the point of Mariato, on the Pacific, a distance of about 118 miles. The narrowest part lies between the Gulf of San Blas, on the Atlantic, and the mouth of the river Chepe, on the Pacific, a distance on a straight line of 31 miles.”—*Colombia, Bureau of American Republics*.

(b) GENERAL PHYSICAL GEOGRAPHY.

“MOUNTAIN RANGES.—Panama belongs geographically to Central America, and is the last of the long line of isthmian formations which form so many links in the chain by which the northern and southern continents have been connected since Tertiary times. At the Costa Rican frontier it trends round from southeast to east, and maintains this normal direction through a series of rythmical curves for over 400 miles to the Atrato Valley, which, jointly with that of the San Juan, forms the true parting line between Central and South America.”—*Stanford's Compendium of Geography, Central and South America, Vol. II*.

“A massive range known as the Cordillera de Baudo traverses the Isthmus through nearly its whole length, dwindling away in the neighborhood of Panama. This range approaches now the southern coast and again the northern, and though not a very elevated one (1,557 feet, average height, with peaks of from 2,296 to 2,624 feet, and passes less

than 900 feet high) it gradually increases in both height and breadth as it approaches Veraguas; in Chiriqui it reaches its greatest elevation and runs through the middle of the Department into Costa Rica.”—*Colombia, Bureau of American Republics*.

“Through the Cordillera de Chiriqui the Costa Rican orographic system passes into Panama, which it traverses in its entire length to the Gulf of Darien under various sectional names, such as the ‘Cordilleras of Veragua’ and ‘San Blas.’ These cordilleras do not form a continuous mountain range, but rather a number of loosely connected ridges, spurs, and offshoots, which decrease generally in altitude in the direction of the east, and are here and there crossed by historical passes which fall below 300 feet, and are the lowest that occur anywhere between the Atlantic and the Pacific.

“It seems obvious that here also the two oceans formerly communicated through several channels, and that Panama, like other parts of Central America, constituted an insular chain, which has since been merged in continuous land partly by volcanic, partly by meteoric agencies. This may be even inferred from the geological constitution of the uplands, which consists in the west of comparatively recent eruptive rocks and elsewhere largely of granites, gneiss, dolerites, trachytes, and crystalline schists.

“In the extreme west, where the Panama highlands attain their greatest elevation, the Central American igneous system is continued by three apparently extinct volcanoes—Pico Blanco, Rovalo, and Chiriqui. West of Veragua the system becomes fragmentary and, so to say, dislocated, culminating in Mount Capiro, on Panama Bay, then falling to 700 feet in the Ahoga-Yeguas hills, which are crossed by a pass only 380 feet high, followed by the still lower Culebra Pass (290 feet), where the Isthmus itself contracts to a little over 34 miles in a direct line from sea to sea. In the San Blas section, with a mean altitude of less than 2,000 feet, the highest peak scarcely exceeds 3,000 feet, and here the Isthmus narrows to about 18 miles between San Blas Bay on the Atlantic and the head of the tide waters in the Rio Bayano on the Pacific coast. (*Stanford's Compendium of Geography, Central and South America.*) Near the western extremity of the Isthmus are found peaks of some considerable height, such as Cerro Santiago, 6,234 feet; Volcan de Chiriqui, 6,480

feet; Cerro Picacho, 7,054 feet; Cerro Horqueta, 6,234 feet, and Pico Róbaldo, 7,012 feet.”—*Report of the Intercontinental Railway Commission, Volume II, part 1, 1891-1898.*

RIVERS AND LAKES.—“The mountainous regions in the central part of the Department of Panama give rise to innumerable brooks and rivers which have their source in the cordilleras and irrigate the soil in every direction.

“The principal streams that irrigate the province of Coclé are: Rio Grande, Uvero, Hondo, Chorrera, Estancia, Anton, Hato, Farrallon, Chico, Majaqual, Calaboza, Mataabogodes, Piedras, Tejas, Lajas, el Coclé, etc.

“Province of Colon: El Chagres, Indios, San Miguel, Coele, Candelaria, Calabebora, Guasaro, San Diego, Bananos, Changuinola, Sigsola, Tervis, etc.

“Province of Chiriqui: El Doraces or Culebras, el Golfito, Coto, Pavon, Claro, San Bartolome, Chiriqui viejo, Tabasara, Colorado, Chico, Gualaca, Chorecha, Fonseca, Covales, David, Plantanal, Salado, Santiago, etc.

“Province of Los Santos: Rio Cambuta, el Guere, Guarare de la Villa, Pocer, Escota, Parita, Pedasi, Caldera, Aria, etc.

“The province of Panama is irrigated by innumerable rivers, because it embraces the extensive territory of Darien, from whose ridges and mountains rise innumerable rivers, some of which, like the Tuira, the Balsas, the Sambú, and the Tayecua or Marea, are quite large and important.

“Central district: El Bayano or Chepo, the Chagres, the Culebra, Lagastes, Boca Fuerte, Pacora, Hondo, Manzanillo, Gatun, Grande, Chico, Mandinga, Nombre de Dios, Aguacata, and Capira.

“Territory of Darien: El Tuira, the most important of the rivers of the Isthmus. It has the greatest volume of water and is navigable by steamships to Yavisa. This river has many affluents, the principal ones being the Chucunaque and its affluent, Yavisa. This Chucunaque River has a long course and receives a multitude of tributaries from the Cordillera Septentrional, the Piedras, Rio Grande, Cupe, Cuna, Nique, Cubunella, Paya, Puero, etc.

“After the Tuira come: The Sambú, the Balsas, the Tayecua and Masea, the Chiman (all these have a great many tributaries), the Lara, Trinidad, the Sabana, Santa Barbara (which receives the waters of the Congo), the Cupunate, Pimeguilla, San Antonio, etc.

“Lastly, the province of Veraguas is irrigated by the following rivers: San Pedro, San Pablo, Viro, Bubi, Punta-gorda, Rosario, Rio del Muerte, Corota, San Lorenza, Cañas, Suai, Cate, Santa Lucia, Rio Arena, Rio Quebro, Torco, Negro, etc.”—*Directory of Panama, 1898.*

“Several of the isthmian streams descending from the central uplands have a somewhat lengthy course, their lower valleys being disposed parallel with the coast. But their basins are too narrow to send down any great volume except during the floods, when they often rise suddenly 20, 30, or even 40 feet above their normal level and sweep with tremendous force and velocity down to the coast.

“Such is the régime of the Rio Chagres, which has its course in the center of the Isthmus, and has hitherto proved one of the most formidable obstacles that the constructors of the Panama ship canal have had to contend with. After its junction at Matachin with its chief tributary, the Obispo, descending from the Culebra uplands, it flows directly to the north coast near Colon (Aspinwall), where the entrance is obstructed by a bar with an average depth of about 10 feet. In ordinary years its level ranges from 14 to 40 feet with the seasons, but unusually heavy rains may at times cause an absolute rise of as much as 40 feet, with a discharge of from 65,000 to 70,000 cubic feet per second. The difficulty of controlling such a volume rushing at tremendous speed down a narrow valley seems insurmountable, and all attempts at regulating these sudden freshets have hitherto proved ineffectual. The railway bridges of the interoceanic line running from Aspinwall to Panama are occasionally submerged, while immense damage is caused to the works on the Atlantic section of the canal.

“On the Pacific side the Rio Bayano presents fewer obstacles, because the western slopes are drier. But the bar at the entrance to its broad estuary is only 2 or 3 feet deep at low water, while the bay itself shoals so gently that large vessels have to ride at anchor 4 or 5 miles off the coast. Hence costly harbor works will be required at the Pacific entrance whenever the ship canal reaches the Gulf of Panama.”—*Stanford's Compendium of Geography, Central and South America.*

“Various rivers flow into either the Atlantic or the Pacific, some through long and narrow valleys, others by shorter courses. The principal river is the Tuira or Darien. It rises

in the heights of Aspaves and receives the waters of a number of tributaries, among which may be named the Nique, Balsas, Paya, Puero, Cano, Lomon, Chucunaque (which itself has several tributaries navigable for small vessels), and the Tayecua or Marca. As thus increased the Tuira flows into the Gulf of San Miguel on the Pacific coast.

“The River Coclé is some 70 miles long, being navigable for small vessels for about 40 miles. It rises in the Andes, and receives the waters of 14 tributary rivers and a multitude of brooks. The Rio de los Indios and the Calabebora rise in the desert range which traverses the Isthmus and empty into the Atlantic. The first is navigable for 18 miles and the second for 21. The Doraces forms the boundary with Costa Rica. The Chiriqui and the Guazaro flow into the Atlantic.

“Another important river is the Bayano, or Chepo, which rises in the Andes and flows west and then southwest into the Gulf of Panama. It is about 160 miles in length and is navigable for about 125 miles. It collects on its course the waters of a number of tributary streams. The River Chagres is 102 miles long and navigable for about 60 miles. It receives the waters of more than 21 tributaries, and flows first southwest and then northwest, finally emptying into the Caribbean. Part of its channel has been utilized in the construction of the interoceanic canal.

“The Zambú River rises in the heights of Aspave and flows nearly parallel with the southern coast until it empties into the Gulf of San Miguel. It is navigable some 93 miles. The Chico and the Santa Matia flow into the Parita Gulf, the San Pedro and San Pablo flow into the Ensenada de Montijo, the Tabasara, Santiago Fonseca, and Chiriqui-viejo empty into the gulf of Alanje, and the Golfito flows into the Golfo Dulce, on the boundary of Costa Rica.”—*Colombia—Bureau of American Republics, 1892.*

“The principal lagoons and marshes are: The lagoon of Chiriqui (improperly called lagoon, as it really is a gulf or bay, well protected by the archipelago in front of it), the lagoon of Tacu, and the lowlands of Catibal and Pruaya.”—*Directory of Panama, 1898.*

CLIMATE.—“The climate varies very much, it being in certain regions warm but healthful, in others damp and sickly, and in others cold and salubrious.

“The whole coast, from the boundary of Costa Rica to the Gulf of Uraba, has a hot and damp climate, in which it is dif-

fiicult for the white race to flourish by reason of swamps and marshes, whose exhalations are extremely unwholesome. To this is added the intensity of the heat, aggravated by the great humidity produced by the frequent rains and by the aqueous vapors rising from the sea, which the prevailing winds carry to the wooded plains that fringe the entire territory. There is a part of the Pacific coast to which this does not apply, for from Panama to Cape Burica there are no marshes or wooded plains, but, on the contrary, cereal-bearing fields and rivers which water and fertilize that generally inhabited region. The climate is as a rule warm, but not so damp, which permits the inhabitants to enjoy good health. The cordilleras are all cool and salubrious, but their slopes are uninhabited, both on the southern side, which bears the cereal grasses, and on the northern, which is covered with woods.

“The coast from Panama to El Choco is unhealthy. The interior of the Isthmus of Darien is very sickly, and only the negroes and Indian half-breeds can stand its excessively rainy climate, hot and damp, and its atmosphere, which the marshes make malarious. Though about the Darien cordillera the temperature is milder, it can not be said that the region is salubrious, and it will never be until the great woods and groves shall have disappeared.

“In Porto Bello the climate is unhealthy and the heat excessive by reason of the stagnation of the air and because the port is surrounded by high mountains, and noxious exhalations emanate from vegetable matters, both terrestrial and aquatic. The nights there are often stifling and the days marked by rains, with thunder and lightning, such as can not but terrify the unaccustomed visitor.

“It may be said that it rains in the department of Panama at least nine months in the year, and that, too, in extraordinary quantities. There occur, too, brief but very hard ‘scuds’ or showers and much thunder and lightning—a sure proof of the abundance of electricity in these regions.

“The dry months are February, March, and a part of April, and the hottest months are August, September, and October, in which the heat becomes almost unbearable. In the other months the breezes and the continual rain render the heat less intense, though, on the other hand, they make the climate disagreeable.

“In the territory which formerly constituted the provinces

of Chiriqui and Veraguas the heat is intense, though tempered by the rains from April to December. In the part of the Isthmus bordering upon the Cauca it rains all the year round at such a rate as to make the rainfall 90 cubic inches, while in Europe it is only 28 or 29."—*Handbook of Colombia, Bureau of American Republics.*

"When the sun is north of the Isthmus southerly winds prevail, and when south, northerly winds. As is the case with monthly means, the changes of temperature from hour to hour and from day to day are subject to much less variation on the Isthmus than in regions more remote from the equator. Alhajuela fairly represents the climate of the interior. Here the temperature at sunrise in the dry season is about 72° ; it soon rises rapidly, attaining about 87° at 1 p. m.; after this it falls rapidly to about 81° at sunset, and then subsides gradually to the minimum at sunrise. During the rainy season the temperature at sunrise is about 74° ; it rapidly reaches a maximum at noon, about 85° , and then falls to about 80° at sunset, and later to the minimum at sunrise. Thus, during the dry season, the daily temperature has a larger range and a later maximum than when rain prevails.

"At La Boca, situated on the bay of Panama, the minimum temperature occurs later, or at about an hour after sunrise, being then about 75° in both the dry and the rainy seasons. The maximum in the dry season, 86° , is reached at about 4 p. m., and in the rainy season, 84° , at about half past 2 p. m. The rate of fall is more gradual than at Alhajuela, the mercury receding at sunset in the dry season only to about 86° and in the rainy season only to about 83° . In short, the changes on the Pacific coast are less extreme and are later than in the interior, but the daily average is about the same.

"An annual rainfall of about 140 inches may be expected on the Atlantic coast, about 93 inches in the interior, and about 60 inches near the shores of the Pacific. There is a well-defined dry season, beginning in December and including the months of January, February, March, and part of April, a period during which the sun is returning northward from his southern journey to the Tropic of Capricorn, and the locus of heavy rainfall has been transferred southward from the Isthmus. This comparative exemption from rain is characteristic of the interior and of the Pacific coast, but somewhat less so of the region bordering the Caribbean Sea.

“Natives of the temperate regions can not safely perform arduous manual labor under exposure to a tropical sun, and dependence for such work must be placed upon the negroes of the West Indies. White men can supervise, but must not attempt more.

“Considering the average figures for the past four years, with a personnel of 2,275 on the canal, the percentage of disease has been 29.65 and the mortality 2.35 per cent. These figures do not exceed those on large works in any country.

“It should, however, be added that this personnel has been long on the Isthmus and is well acclimated.

“Among infectious diseases on the Isthmus yellow fever is undoubtedly the most to be feared by unacclimated persons of the white race. During the two recent epidemics of yellow fever, the first from May to December, 1899, and the second from March to September 10, 1900, only two cases appeared among the personnel of the company. The disappearance of yellow fever from the Isthmus from the year 1892 to the year 1897 would lead to the belief that the disease is in no wise necessarily endemic. The city of Colon, which up to about the years 1891 and 1892 was a terrain than which nothing could be better for yellow fever, reputed more dangerous than the city of Panama, has since that time remained free from any infectious disease and has escaped the yellow-fever epidemics of 1897, 1899, and 1900. This is due to the sanitary works which have been executed, the filling up of the many little swamps, and the cleaning of streets which before were veritable sewers. By these improvements the city of Colon has been considerably freed from the swarms of mosquitoes which rendered life insupportable.

“Might not a like result be secured for the city of Panama (1) by a good supply of pure water; (2) by drains to conduct sewerage to the sea, to which its situation and conformation are easily adapted, and (3) by watering the streets daily in the dry season and by cleaning them daily throughout the entire year. Now they are in a repulsive condition of filth. These three improvements, which I consider fundamental and essential, are now wholly neglected.

“There should also be instituted an effective quarantine service for vessels arriving in the harbor, for beyond all doubt the epidemics of 1897, 1899, and 1900, and the few cases which occurred in January, 1901, were due to importa-

tions, in one instance from the Atlantic and in three instances from the Pacific.”—*The Engineering Magazine, July, 1903.*

“In the late summer and autumn months, when the northers are replaced by the southeastern trade winds, the Atlantic coast lands are occasionally visited by terrific cyclones, such as that of October, 1865, which wrought destruction among the shipping at Colon and was felt as far north as Cape Gracias a Dios. Thanks to these monsoons, the annual rainfall often exceeds 120 inches on the Atlantic side, or about double the discharge on the Pacific coast. But malarious affections are everywhere prevalent and yellow fever a frequent visitor, so that the Isthmus still remains the Sepultura de Vivos, the ‘living grave’ of Europeans, as it was named by the first Spanish settlers.”—*Stanford's Compendium of Geography, Central and South America, Vol. II.*

“In 1896 the average mortality was slightly over 64 per 1,000. Although this is considerably below the rate for 1888, when the canal encampments held an army of laborers equaling the present entire population of the city of Panama, and when, owing to their gregarious condition and the prevailing dissipation, epidemic diseases ran riot among them, carrying off scores at a time; nevertheless it is sufficiently high to brand the district with a distinctive and invidious character for insalubrity.

“Of the deaths that have occurred, 29 per cent are due to lung complaints, 18 per cent to febrile attacks, 10 per cent to dysentery, and the balance to a variety of causes.

“If further proof of the great mortality that prevails at Panama were wanting, the fact that with a dwindling population upward of 18,000 corpses have been received into the new Roman Catholic cemetery here since its inauguration in 1884 is of itself conclusive.

“Leprosy is another of the baneful scourges that have made the Isthmus their home. It is impossible to ascertain, even approximately, the number of lepers that infest the department, but, judging from experience, were the exact number made known the result would be, to say the least of it, startling. There is a lazar home for these unfortunates just without the city of Panama, at Punta Mala, where a few of the more hideous cases are segregated from the rest of mankind, but it is a primitive affair, and its unfortunate occupants receive neither medicine nor medical attendance. This

disease has become so great an evil throughout the Republic that the Government seriously contemplates converting Coiba Island, in the Pacific, into a leper refuge."—*Colombia, British Diplomatic and Consular Reports. Report for the year 1896 on the trade of Panama.*

"Colon can at no time be considered a healthy locality nor in any respect a very desirable place of residence. In the beginning of the so-called 'invierno,' or wet season, tropical fevers are most frequent and fatal. What is called the 'verano' (summer), or dry season, is better. It is less unhealthy, and with proper care a stranger may sojourn there for a few weeks or months without constant dread of the cemetery. The streets, though very much improved of late, are often impassable in wet weather and never attractive when dry. The town is environed by stagnant ponds and lagoons, and the inland breeze is always laden with deadly malaria. Sickening odors assail the nostrils at every turn. The only species of animate nature which seems to really enjoy life here is the mosquito. Day and night he is your constant companion.

"However, the Isthmus can not be judged by Colon, as it is quite different on the Pacific shore. The distance by rail is 47 miles, and the cost of transportation about \$4 in American gold coin. The time required is about three hours. During the first hour's ride from Colon to Panama there is very little to be seen. The country is a mere succession of swamps and lagoons, where it would seem impossible for human beings to live. Yet even before the country was partially reclaimed from a wilderness state by the railway there were occasionally seen rude huts inhabited by Indians, negroes, and mestizos. A little farther on cone-shaped hills with intervening lagoons and rapidly running streams are seen. Before the De Lesseps Canal Company cleared away the forest and jungle and thus changed the whole aspect of the country these hills and little mountain slopes were covered with dense forests, which were resonant with the screams of red monkeys and the shrill notes of tropical birds. All along the railway, even in this unfavored region, one now sees little towns and settlements, but few or no good houses. The habitations are for the most part thatched-roof sheds with dirt floors, and their inmates can hardly be classed as belonging exclusively to either of the three primal races.

"Ascending the dividing ridge between the Atlantic and

Pacific shores a marked change for the better is perceived. The whole aspect of the country is different. The temperature, though but a few degree lower, is less oppressive. The air is purer, the environments are more cheerful and inviting, and we no longer experience that strange mental depression which we felt on the Colon side. As we begin the gradual descent of the water-parting ridge toward the Pacific coast the beauty of the landscape often charms us, and we are tempted to forget all the discomforts and annoyances of Colon.”—*The Colombian and Venezuelan Republics, Scruggs, 1900.*

“The late George S. Morrison, the civil engineer, in his address in December last before the American Geographical Society, said that the death rate on the Isthmus could be greatly diminished. He attributed the unhealthful climate to the fact that no systematic sanitary work has ever been undertaken.

“He said that before the United States could begin work on the completion of the canal thorough sanitary improvements should be made. With sanitary control and discipline exercised by the United States the greatest difficulties that have hitherto beset the Isthmus of Panama would be removed.

“The conditions of the Isthmus would be no worse than that of other damp tropical countries. The hills along the line of the canal would furnish sites for gardens and residences. He thought it was not impossible that in time this region, which has been regarded as one of the world’s pest holes, might become a favorite winter resort.”—*New York Sun, November 15, 1903.*

“FAUNA.—The great forests of Panama contain many wild animals, among which we may name the tiger (black or spotted), the jaguar of Darien (as voracious as that of Venezuela), the cougar, the javali or wild boar, the chunzo, erizo (hedgehog), lion (red, yellow, or black), oso hormiguero (ant bear), tigrillo (small tiger), zorro (fox), conejo (rabbit), tapir, venado (deer), puerco espin (porcupine), gato (cat), mono (monkey), and armadillo.

“On the Atlantic coast there are the tortoises, whose shell is so largely used, and white and green turtles. On the Pacific, besides the pearl oysters, there are found many kinds of oysters and mussels, and crustaceans, such as lobsters, crabs, shrimps, etc. In the sea the animals to be feared are

the tintorera (cuttlefish), the guaza, the manta, and the shark. In both oceans there abound the ceruzati, a fish weighing 55 pounds, and the mero, which weighs over 110. There are found also the bagre, the peztierra, the quichavo, the paro, and the casus, of some size, and the hurel, barbado, sábalo, hurello, corvina, cominata, and ruejo, of very fine flavor.

"There are in Panama two kinds of alligators and many kinds of iguanas. Among serpents we find the boa, the berrugosa, the equis, the bejuco, the cazadora, the boba, the viper (of many kinds and very poisonous), coral, and many sorts of lizards."—*Colombia, Bureau of American Republics*.

"The air also is alive with birds of gorgeous plumage—tanagers, toucans, humming birds, and euphonias (*Euphonia musica*)—the songs of many being varied by the discordant chatter of the monkeys, springing wildly from branch to branch, and by the screaming of noisy parrots. Among the few indigenous forms is the chrysothrix, a species of monkey which is confined to the Chiriqui district and will not live elsewhere. Most of the other mammals and other animals—tapirs, peccaries, pumas, jaguars, alligators, ant eaters, climbing porcupines, iguanas, deer, vampires—are common to all the surrounding lands."—*Stanford's Compendium of Geography: Venezuela and Colombia*.

"FLORA.—To the high temperature and precipitation corresponds a tropical vegetation of amazing exuberance and variety, especially in the southern districts, where the Central and South American forms are intermingled. Even the rocky headlands are clothed with verdure to their summits, while the running waters disappear beneath a dense tangle of overhanging branches, trailing or climbing parasites, stems, snags, and matted foliage. Soon after leaving the Atlantic terminus travelers by the interoceanic railway find themselves surrounded by scenes of tropical splendor such as can scarcely be surpassed even in the Brazilian woodlands. Cacao shrubs, palms, bananas, and breadfruit trees stretch their branches and foliage out on both sides, while the saturated soil is covered by a luxuriant growth of water plants of the most varied colors."—*Stanford's Compendium of Geography: Central and South America*.

"There are plants having medicinal and dyeing properties, textile and oleaginous plants. The Province of Veraguas

produces caracolillo, whose rare violet-purple tint is so much esteemed. Splendid palms of many kinds, cacti of capricious forms, and varieties of orchids abound. On the terraces and in the gardens of Panama flourish the aristocratic kananga of Japan, the starry jasmine, the heliotrope, the rose of Alexandria, and many other choice and delicate flowers.”—*Directory of Panama, 1898.*

(c) **COAST LINE.**

GULFS, BAYS, ETC.—The Department of Panama has on the Atlantic side some 478 maritime miles of coast, 240 between the mouth of the Tarena River and Colon and 238 between Colon and Costa Rica. On the side of the Pacific the coast of Panama is 767 maritime miles in length.

“On the Atlantic coast the principal ports or bays are those of Colon or Aspinwall, Almirante, Chiriqui, San Blas, Caledonia, and Porto Bello. Besides these there are some 25 smaller ports.

“On the Pacific coast the principal ports or bays are those of Panama, San Miguel, Montijo, and Golfito. There are in addition some 30 smaller ports, among which may be mentioned that of Boca Chica, which serves as the port for the town of David.”—*Colombia, Bureau of American Republics.*

DESCRIPTION OF THE ATLANTIC COAST.

“**CURRENT.**—On arriving within about 30 miles of the southern shore of the great bight known as the Gulf of Columbus, the pent-up water is forced to the eastward. This great eddy will generally be found running between Salt Creek and Porto Bello at the rate of 2 to 3 knots an hour. It is also to be observed that the northeasterly current runs strong close to the entrance of Porto Bello, and in the rainy season from $1\frac{1}{2}$ to even 3 knots an hour as far as Farallon Sucio. Between the entrance of Chiriqui Lagoon and Chagres there is often, however, a narrow stream setting to the westward, which extends about 3 miles from the shore.

“**TIRBI (TERRABA) POINT** forms with Sarabeta Point the west entrance of Boca del Drago into Almirante Bay. On the west side of Tirbi Point the shore forms a dangerous bight, called Tirbi Bight. Between the points, three-fourths mile apart, is the front of a small neck of low wooded land, which is skirted by a reef on which the sea breaks heavily.

“CAURO AND LIME POINTS form the east side of entrance, the bar between them being shallow, and there is a patch of $1\frac{3}{4}$ fathoms about midway between the points. A spit with less than 3 fathoms extends one-half mile across the entrance from Lime Point in the direction of Sarabeta Point, with 6 to 10 fathoms close-to.

“BOCA DEL DRAGO, the western entrance into Almirante Bay, is only one-fourth mile wide in the narrowest part and one-third mile at the entrance, and although affording a depth of 9 fathoms is so tortuous and exceedingly sharp in its turnings that it is too difficult for strangers to navigate without the aid of a pilot, who will come off from the settlement on seeing the usual signal. The Boca has in the channel a least known depth of 5 fathoms.

“SHOAL.—A shoal spot with 5 fathoms of water on it has been reported off the entrance to Boca del Drago, where a depth of 8 fathoms is indicated on Hydrographic Office chart No. 1384. The 5-fathom spot is on the following bearings:

“Sarabeta Point, S. $31^{\circ} 30'$ W. (S. 26° W. mag.), distant 2,100 yards.

“Lime Point, S. 1° W. (S. 5° E. mag.).

“Approximate position: Latitude $9^{\circ} 26' 36''$ N., longitude $82^{\circ} 20' 30''$ W.

“SETTLEMENT.—The settlement extends on either side of Lime Point. Water is scarce, but a small supply of vegetables may be obtained. There is excellent firewood on the western shore.

“DIRECTIONS.—The Boca del Drago can only be entered under sail, with the sea and land breezes. Swan Cay, 180 feet high, and Sail Rock, 40 feet high, about 2 miles north-eastward of the entrance, are good marks; the latter is steep-to on its west side, and may be passed at a prudent distance.

“When a mile from the entrance the opening should be brought to bear S. 3° W. (S. 3° E. mag.), when a remarkably large tree on the extremity of Lime Point will be seen. Lime Point tree and Tristan Point in line lead nearly in mid-channel. Tristan Point is formed by tall table-topped trees, but has the appearance of a low bluff headland.

“Proceeding in with the range given, it will be necessary to bear up as short round as possible when Norte Point is seen just open of Cauro Point, N. 73° E. (N. 67° E. mag.), keeping it so astern until within about 300 or 400 yards of the western

shore, which is steep to the edge of the reef, and then haul up quickly S. 15° W. (S. 9° W. mag.), through the inner part of the narrows. When Cauro Point bears N. 43° E. (N. 37° E. mag.), or Swan Cay is open northward of it, the bank off Lime Point will have been passed, and a S. 35° E. (S. 41° E. mag.) course will lead into the lagoon, in not less than 5 fathoms, where anchorage may be taken up as most convenient under Columbus Island. The clump of trees on the mainland resembling a tower, formerly used as a leading mark, is not to be distinguished.

“TIDES AND CURRENT.—The tides at the Boca del Drago are similar to those at the Boca del Toro, but the easterly current sets against the ledge off the north end of Columbus Island with such force that it is turned to the southward, and, overpowering the ebb, runs into the lagoon at the rate of a knot an hour.

“CAUTION.—A vessel meeting with a calm or light airs between the Sail Rock and the entrance, or becoming unmanageable, should anchor at once and await a commanding breeze. The turnings in the narrows being so sharp, the utmost attention must be paid to the sails to maneuver quickly; and, if time permit, it will be safer to place a boat at the junction of the leading marks. H. M. S. *Cordelia*, 1865, found depths of 4 fathoms in the inner part of the channel where 6 fathoms formerly existed.

“ALMIRANTE BAY is about 13 miles in extent from east to west, but its interior is crowded by small islands, and its shores are so irregular that from north to south the breadth varies from 2 to 13 miles, and near the middle the bay almost forms two basins. In consequence of this it may be said to possess harbors within harbors, in which vessels of the largest class may enter without much difficulty, and in many places lie alongside the shore in security.

“The south side of Almirante Bay is bounded by a remarkable ridge of table hills, lying at the base of the great Cordillera, extending in a southeast and northwest direction about 15 miles. In some places it rises precipitously from the shore to the height of 600 or 700 feet, and only 2 miles inland reaches an elevation of 1,748 feet, which increases to 2,000 feet at its northwestern extremity. Several small streams descend from these heights into the southwest and west sides of the basin, but they are only navigable for a short

distance by small canoes. The east and west sides are very low and swampy and densely wooded. The north side is bounded by Columbus and Provision islands.

"COLUMBUS ISLAND is 7 miles long northwest and southeast and about 3 miles broad. It is flat and densely wooded, the tops of the trees being from 200 to 400 feet above the sea. The east side of the island is bounded by a white sandy beach, which forms two slight bays, and from Long Bay Point, which separates them, a dangerous reef extends to the northeast $1\frac{1}{4}$ miles, breaking heavily in fresh breezes. The outer end of this reef lies N. 28° W. (N. 34° W. mag.), $3\frac{1}{4}$ miles from Cape Toro, and the edge of soundings is only three-fourths of a mile distant.

"The northern extremity of the island is low and rocky, and from it a ledge of rocks extends northwestward $1\frac{1}{2}$ miles, but being dry in places and having on it some remarkable islets which serve as marks, it is not so dangerous. Sail Rock, the outermost of the above islets, lies at the extremity of the ledge and is 40 feet above the sea. It is a barren black rock, steep-to on its west and north sides.

"Swan Cay, S. 51° E. (S. 57° E. mag.), one-half mile from Sail Rock, is a narrow rock about 70 yards long rising perpendicularly to an elevation of 180 feet and crowned with brushwood and a few cocoanut trees. There is no safe passage between these cays and North Point.

"The western extremity of Columbus Island is low and sandy and about a mile distant from the adjacent point on the mainland. Upon it is a small settlement. The south shore is low and swampy and bounded by mangroves, which are closely skirted by a coral ledge, steep-to.

"SETTLEMENT.—The principal settlement, Boca del Toro, now covers considerable territory, and the little fort is no longer distinguishable, the ground having been reclaimed and built upon for about half a cable to seaward. It is the seat of government on this part of the coast, and is on the southeast end of Columbus Island, on a narrow peninsula, faced on the north by a shallow bay open to the northeast. The population in 1894, including Old Bank settlement, amounted to about 5,000 inhabitants—Indians, negroes, and Spanish-Americans.

"The trade is principally in the hands of Americans.

"The boat landings are on the southeast side of the town.

There is a wharf at the settlement, alongside of which fruit steamers load. About five steamers call weekly during the fruit season (March to August). A buoy, which is not to be depended upon, marks the 2-fathom patch, 4 cables S. 16° W. (S. 10° W. mag.) from Fort Point. The patch of 2 fathoms charted northeastward of it has but 1½ fathoms.

“The United States is represented by an acting consular agent.

“SUPPLIES.—Fresh beef is scarce and of poor quality. Pork and poultry can be had in moderate quantities, but at high prices.

“Preserved provisions, salt meats, and bread are imported by trading firms, but a large stock is not kept on hand.

“Good fish are plentiful in the bay, and game is said to be abundant on the mainland.

“WATER.—Rain water is all that is to be had; it is contained in an iron tank (an old boiler) of a capacity of about 6,000 gallons.

“COAL.—There is no imported coal in the place, but coal of fair quality can be mined in the immediate neighborhood, and at very moderate cost, by using native labor.

“PROVISION ISLAND is 8 miles long east and west, with a ridge of irregular hills on its north side from 300 to 400 feet high. On the south side of this ridge the land is low, swampy, and skirted by numerous mangrove cays, with boat channels between, which extend all the way to the Crawl Cay Channel. The northeast side is foul, and the sea breaks on it with great violence to the distance of three-fourths of a mile from the northeast point. Cape Toro, the northwestern extremity of the island, is a bold scarped headland, easily recognized. There is a small black rock, steep-to, about 300 yards to the northeastward of it. A reef, steep-to, and on which the sea generally breaks, extends west nearly one-half mile from the cape.

“The west end of the island terminates at a low, sandy point, upon which there is a small settlement, and the land about it is so fertile in the growth of tropical fruits and vegetables that it gives the name to the island.

“BOCA DEL TORO, between Columbus and Provision islands, is the principal channel leading into the bay, and between Careening Cay, close off Columbus Island and Provision Island, it is about three-fourths of a mile wide. Both

sides, however, are skirted by a coral ledge, so that in the middle, in the narrowest part, it is only about one-fourth of a mile across. In the middle of the channel and across the Garcia bank or Middle ground, which lies just within the bay, a depth of not less than 5 fathoms may be carried; and if buoyed, 6 fathoms could be maintained.

"The edges of the reefs on the Provision Island side generally show themselves, but the water is so muddy at the entrance that the shoals there are not visible, and as Long Bay Point is dangerous, strangers will require a pilot.

"SHOAL.—The existence of a small coral patch is reported in Boca del Toro with 3 fathoms of water over it at low water. The 3-fathom spot is on the following bearings:

"Careening Point, N. 3° E. (N. 3° W. mag.), distant 800 yards.

"Mangrove Point, S. 81° W. (S. 75° W. mag.).

"There are depths of 4 and $4\frac{1}{2}$ fathoms close around this patch.

"DIRECTIONS.—In a case of necessity, or with but little local knowledge, the following directions for the Boca del Toro will be useful and, to vessels drawing under 17 feet, quite safe.

"There is not much difficulty in recognizing the entrance, Cape Toro being a remarkable bold headland, but it must be approached from a northeast direction at a wide offing and with the sea breeze. An easterly set of the current should be allowed for. When the channel comes fairly open, bearing S. 21° W. (S. 15° W. mag.), a very remarkable large tree on Cristoval Island, called 'Pillar tree,' will be seen.

"The range for approaching and entering is Pillar tree in range with the eastern side of Split Hill and not the center of the hill. A small notch will be seen just to the eastward of the highest part of Split Hill and on the eastern slope; this in range with the Pillar tree will carry nearly in the center of the channel. Should the range be shut in by rain or mist after getting on it, it is better to head for the eastern tangent of Careening Cay until Toro Point bears abeam and then to head the course by compass about S. 20° W. (S. 14° W. mag.) through the channel, turning when Mangrove Point bears S. 82° W. (S. 76° mag.). A S. 48° W. (S. 42° W. mag.) course will lead across the deepest part of the middle ground, in 4 to 5 fathoms, when anchorage may be taken as most conven-

ient, in 12 or 13 fathoms, mud, provided Careening Point does not bear eastward of N. 17° E. (N. 11° E. mag.).

"The south end of Careening Cay is sufficiently steep for a vessel to heave down alongside, and between it and the Fort Point there is a 12-foot channel, admitting coasting vessels to a more sheltered anchorage off the settlement.

"In leaving the lagoon by the Boco del Toro it will be necessary to wait for the land wind. To attempt working out against the heavy swell which usually rolls in would be attended with considerable risk, notwithstanding the assistance of the outset, and if caught at the entrance by the sea breeze it will be more prudent for a vessel of heavy draft to run back. It is also necessary to be cautious not to haul out to the northeast before Cape Toro bears S. 74° E. (S. 80° E. mag.) to avoid the reef from that point.

"CAUTION.—Vessels drawing 18 feet should sound and buoy the channel, as Garcia Bank has changed, but there is a channel with a least depth of 4 fathoms.

"PILOTS.—Local pilots come off to ships, but are not reliable.

"TIDES AND CURRENT.—It is high water, full and change, in the Boca del Toro at 12h. 15m., and the rise is from 1 to $1\frac{1}{2}$ feet. There is no flood stream, but a continual outset, depending upon the rains; in the dry season its strength is about a knot. The great easterly eddy sets on to the cays off the north side of Columbus Island at the rate of from 1 to 2 knots, and it will be met with off the Boca del Toro and should be allowed for after the cays bear southward of west.

"SHEPHERD HARBOR.—Of the many small basins formed by the islands off the south shore the largest and most favorably situated lies at the southwest end of Almirante Bay and is named Shepherd Harbor. It is about 4 miles in length in a northwest and southwest direction and from 1 to $1\frac{3}{4}$ miles in breadth, with a depth of 12 fathoms on muddy bottom.

"On the northeast side it is bounded by Shepherd, or Iguana, Cay, which is $1\frac{1}{2}$ miles long east and west, about one-half mile broad, and, in the highest part, 264 feet high. From the southeast end of the island a narrow coral ledge stretches off to the southward about a mile, upon which are several cays, the two largest named Garcia and Roldan. The channel between the south end of Roldan and the main is nearly one-half mile wide. From Snapper Point, which forms the south point of entrance, a ledge, nearly dry and steep-to, projects

to the northward 300 yards, but Roldan is bold to within 100 yards; elsewhere it is quite clear, with a depth of 15 fathoms.

"The western channel, between Shepherd Cay and Iguana Point, is about one-half mile wide. The cay is clear to within 100 yards, but from Iguana Point a coral ledge shows itself to the distance of 200 yards and is steep-to. All the dangers in the interior of the harbor are confined to the south shore and easily seen from aloft, and the coral ledges, which fringe most parts of the mangrove shores to a short distance, are so bold that a vessel may lie close to them. Secure anchorage may be taken up anywhere, as most convenient for watering, wooding, or refitting, and in many parts large vessels may lie alongside the shore. Shepherd Cay and the adjoining cays and a considerable portion of the mainland adjacent are now almost completely cleared and covered with banana and cocoa plantations. American steamers visit the several plantations in Almirante Bay and collect the produce. There is a landing wharf at the southeast corner of Roldan Cay. The chief supplies, however, are grown on the banks of the streams on the mainland, principally at Saurian and Cultivation creeks. Here the land is of extreme fertility and produces all the tropical fruits and vegetables, cotton, coffee, and sugar cane in the greatest perfection and with very little labor.

"The dense forest around the lagoon also yields abundance of most excellent ship timber, which is used on the island to build canoes and small coasting vessels. The most valuable timber is the eboe tree, which has a diameter of from 3 to 4 feet and grows straight from 50 to 60 feet, with large spreading arms, having crooks of all forms and dimensions. The zapatilla attains about the same height and is from 2 to 3 feet in diameter, but being rather brittle it requires caution in felling. The sum-wood, called also Spanish elm and caparo, is of the same dimensions, saws and works well, and is well adapted for planking, as it resists the trying effects of this climate better than the woods generally used for this purpose. This tree is also found on Popa Island. Cedar also grows to great size and perfection, and is used for the construction of large canoes, dories, and pitpans.

"WATER.—Four small streams flow into the south side of Shepherd Harbor, but they are only navigable for small canoes for a short distance. The largest is Saurian Creek, and it is the best at which to water; a vessel of large class may be conveniently moored within 400 yards of the mouth.

“DIRECTIONS.—Having entered Almirante Bay, if proceeding from the Boca del Toro, the north end of Cristoval Island must be approached cautiously to avoid a small coral ledge which lies northwestward three-fourths mile from Coco Point, the northern extremity of the island; the channel is about $1\frac{1}{2}$ miles wide, with a depth of 15 fathoms. In running or working, Juan Point must not be brought westward of S. 62° W. (S. 56° W. mag.) until the ledge is passed.

“Juan Point is foul to the distance of about 400 yards, and from Tristan Point, on the western shore of the bay, a flat coral ledge, dry in places, extends $1\frac{1}{2}$ miles to the eastward, having 3 and 4 fathoms on its outer edge, leaving a channel $1\frac{1}{4}$ miles in breadth. The Cristoval side must, therefore, be kept aboard; it is everywhere bold within 400 yards, and should it be necessary to work through this part, a little white lookout hut on the highest part of Shepherd Cay must not be brought to the southward of S. 17° W. (S. 11° W. mag.) when standing to the westward.

“The southeast end of the Tristan Reef lies with Mangrove Point well open of Juan Point. To the southward of this there is no danger; either channel may be taken into the harbor, but the southeastern will be the most convenient with the sea breeze, and all that is necessary is to steer in mid-channel or work in by the Eye, avoiding the ledges off the entrance points.

“From the Boca del Drago, after passing Lime Point Bank, care must be taken to haul well to the eastward to avoid a coral bank extending from Donato Point on the western shore, the outer end of which bears S. 3° W. (S. 3° E. mag.) nearly $2\frac{1}{2}$ miles from Lime Point. Tristan Point must also be very cautiously approached, and Juan Point not brought to the northward of East (N. 84° E. mag.), or a depth of not less than 10 fathoms be maintained before Shepherd hut bears to the westward of S. 11° W. (S. 5° W. mag.). With the hut bearing S. 17° W. (S. 11° W. mag.), the end of the Ledge will be crossed in 5 fathoms.

“CRAWL CAY CHANNEL.—At the head of the bight formed by the islands southwest of the Zapatilla cays, between Provision and Popa islands, is the Crawl Cay Channel, leading into the Almirante Lagoon. This cut has depths of not less than $5\frac{1}{2}$ fathoms, between detached coral shoals, but it is so intricate and narrow, being in some parts not 100 yards wide,

that it is quite impossible to give safe directions for its navigation. The sea, however, is so tranquil and clear that every coral head is easily seen, and the tidal stream being weak, the pilotage may be effected by the eye from aloft, provided the weather be clear and favorable and the sun not ahead.

"The entrance is about 300 yards in width, but so hidden by mangrove cays within that it would be impossible for strangers to make it out, and the shore is far too dangerous to approach without being certain of the channel. There is a conspicuous saddle-shaped hill 670 feet high, about S. 62° W. (S. 56° W. mag.) of the anchorage off the Zapatillas, the south hummock of which, when brought to bear about S. 55° W. (S. 49° W. mag.), and in line with the northwestern extremity of Popa island, will lead to the opening.

"The north part of Popa, being formed of lofty trees growing straight out of the water, appears from this direction bold and distinct, and the end of the reef which runs to the northeast off Cobbler Point three-fourths of a mile and forms the east side of the entrance is steep-to and breaks heavily.

"The west extreme of the westernmost Zapatilla island, bearing N. 73° E. (N. 67° E. mag.) astern, leads up to the entrance.

"ZAPATILLA CAYS.—The west side of the outer part of the Tiger Channel is bounded by two narrow sandy islets named Zapatilla, which appear as one island, their general direction being west-northwest. They are each a little more than one-half mile long, and about 1,200 yards apart, a ledge almost dry joining them. Both are thickly wooded, affording excellent firewood, easily obtained; the tops of the trees are about 80 feet above the sea.

"The surrounding reef extends east-southeast 1 mile from the easternmost, the extreme bearing N. 70° W. (N. 76° W. mag.) $4\frac{1}{2}$ miles from the Tiger breaker. Near the extremity the reef is one-half mile broad and generally shows itself, but it skirts the north and south sides of the cays at only a short distance. From the westernmost cay it stretches off a mile in a northwest direction, and at this extremity is 1 mile broad. Between it and the reef off Patino Point there is an intricate channel with many shallow heads.

"ANCHORAGE.—On the south side of Zapatilla Cays anchorage and the best shelter will be found in 10 fathoms, sand and mud, with the west end of the westernmost cay

bearing N. 27° E. (N. 21° E. mag.) about 1 mile distant. The soundings are very irregular and change suddenly in some parts from 6 to 12 fathoms, but everywhere the bottom is formed of mud and sand.

“CAUTION.—The edge of soundings lies about 6 miles northward of the Zapatilla Cays; but farther west the edge is close to the land. At night or in thick weather, if eastward of the Zapatilla Cays, a vessel might stand in until the first sounding is obtained, but this must be done cautiously.

“POPA ISLAND, which forms the northwest boundary of Chiriqui Lagoon, is of moderate elevation, but at the north end there is a very remarkable isolated hill named Mount Popa, with a rounded summit 1,300 feet above the sea, and is a serviceable object. The south side of the island is covered with trees, termed by the traders “sum-wood,” which grow to large dimensions and are conveyed to Cartagena for ship-building. Good coal has been found on this island. There is a channel into the lagoon between Water Cay and Popa Island, carrying 6 fathoms water, but it is too narrow and tortuous for a stranger to navigate. Between the west side of Popa Island and the main there are narrow deep channels leading into Almirante Bay navigable for trading craft and launches.

“CHIRIQUI LAGOON.—The Chiriqui Lagoon is 32 miles long from east to west, 12 miles wide in the center, 5 at its east and 10 at its western extremity, and is capable of receiving in security vessels of all drafts. The entrance between Bluefield Point and Water Cay is $3\frac{1}{2}$ miles wide, and, being open north and south, is very easily recognized. Bluefield Point is a bold rounded headland.

“There is not less than 8 fathoms in the fairway over a channel, which is about one-half mile wide, and there is no bar. The southern part of the lagoon has depths of 15 to 20 fathoms, decreasing toward the shore.

“The principal trading places are the Chirica Mola and Frenchman Creek.

“The north side of the interior of Chiriqui Lagoon is thickly fringed with detached shoals and coral heads, steep-to; and the main entrance itself, although from one-half to 1 mile in breadth, is so intricate that with sailing vessels it should only be taken with the sea and land breezes. These shoals extend to a distance of $4\frac{1}{2}$ miles to the southward of

Bluefield Point, and so block up the east end of the lagoon that that part is only navigable for small handy vessels. The navigation is not difficult, for the water is so clear that the eye can guide from aloft. The mangrove creeks at this end are so deep that they afford ready places for concealment.

"The eastern and southern shores of the lagoon for a very considerable distance inland, as far as Man Creek, 17 miles from the east end of the lagoon, are low and swampy, and there are only a very few spots in this space where a landing can be effected.

"At Man Creek the base of a great spur from the Cordillera reaches the shore and only 2 miles inland has an elevation of 2,672 feet. This lofty ridge extends about 5 miles to the westward, when the Chiriqui Valley, from 3 to 5 miles wide, separates it from another ridge 2,840 feet high, at the southwest end of the lagoon, about $2\frac{1}{2}$ miles inland. At the foot of each of these ranges there is a trading post.

"The south side of the lagoon westward of the Chirica Mola is free of danger and may be safely navigated by the lead. The west side is low, swampy, and uninhabited; it is skirted by a coral ledge from one-fourth to three-fourths of a mile distant, with 6 and 7 fathoms close-to.

"The easternmost stream that flows into the southeast corner of the Chiriqui Lagoon is the Catabella Creek; it is very small and will only admit canoes to a short distance.

"Toro Creek, or San Diego River, empties about $3\frac{1}{2}$ miles westward of the Catabella and communicates with the Chirica Mola just below its rapids. To the westward of the entrance there are a few fishermen's huts.

"WATER CAY is low, flat, and densely wooded, the tops of the trees at the east end reaching to the height of about 120 feet above the sea. The eastern end of this cay is formed of low red-clay cliffs, and very close off the eastern extremity there is a small dry rock, which, on a S. 24° E. (S. 30° E. mag.) bearing, seen just open of the point, is the leading mark into the lagoon. A reef, on which the sea breaks heavily, stretches off from it 300 yards and skirts the whole of the northeast side of the cay. At 600 yards from the east point the depth is 5 fathoms.

"CHIRICA MOLA RIVER is the only stream of any magnitude in the lagoon and enters it 4 miles to the westward of Toro Creek. It has formed a small delta, which projects out

to a well-defined sandy point at the entrance, S. 5° E. (S. 11° E. mag.) 9½ miles from Bluefield Point. On its eastern side, about 1½ miles from the entrance, the shore forms a small cove, named Irish Bay, which has 3 to 4 fathoms, under the mangroves. Small trading coasters generally collect their cargoes here from the small settlements around. They lie completely hidden by the high trees.

"A small low mangrove island divides the mouth of the Chirica Mola into two channels, the eastern of which is alone navigable, and on the bar during the dry season there is less than 2 feet of water. At this period the water is brackish about 2 miles above the entrance. The banks are low and inundated for a distance of about 3 miles, whence they rise, and at the first rapids are 7 feet above the river. To this point, a distance of about 12 miles, the stream varies in breadth from 100 feet to nearly 600 feet and in depth from 2 to 12 feet. As already observed, at the commencement of the rapids a branch of the river turns to the southeast, forming the Toro Creek. Above the rapids the bed of the river is so full of rocks that its ascent can only be accomplished in small strong canoes and with very great labor.

"SETTLEMENT.—About 10 miles above the landing at the rapids, on the right bank, is the most considerable village of the Valiente Indians, and a trading post for a long time has been established here. Cotton and hardware manufactures are brought from Jamaica and bartered for sarsaparilla, vanilla, cattle, and hides. The situation is said to be healthy, and communicates by footpaths with the Biarra and Catabella creeks.

"THE COAST westward of the Chirica Mola forms a bight 5½ miles wide and about 3 feet deep. The interior consists of small mangrove lagoons, in which the manatee is frequently captured. The west end of this bight terminates at the entrance of the Warri or Biarri River, the eastern entrance point of which forms a well-defined and easily recognized projection. The entrance of the Biarra is about 20 feet wide, and on the bar there is only a foot of water in the dry season. Canoes ascend to the first rapids, about 8 miles from the mouth, where there is a small settlement. From this river the mangrove shore of its delta again recedes inward and, curving to the northwestward, forms a large bay, about 8 miles wide and 3 deep. About 3 miles from the Biarra, at

the foot of the highlands already described, is the entrance of Man Creek, which, in the rainy season, is navigable for canoes two days' journey.

"From the head of the bay a shallow bank extends out nearly 2 miles, and in the southwest corner, by the side of a rivulet at the base of the hills, there is a trading post.

"Thence the coast is low and swampy, forming the delta of the Chiriqui, which river enters the lagoon at the north-west point of the bay. The shore in this space is closely skirted by a coral ledge, steep-to. The entrance of the Chiriqui River is so small that a stranger will have great difficulty in discovering it among the narrow openings in the mangroves. In the dry season the bar is impassable, except by hauling over it, and in the heavy rains the numerous rapids are too formidable even for canoes.

"From the Chiriqui the low swampy shore which bounds the Chiriqui Valley trends westerly 5 miles to Frenchman Creek. About midway is Cabbage Creek, of no importance.

"FRENCHMAN CREEK emerges at the base of the lofty ridge which forms the west side of the Chiriqui Valley, and, although unnavigable, taking its rise in the adjacent mountains, it is a constant running stream of good water. The land to the southwestward and westward of it is firm and wooded all the way to the southwest end of the lagoon, and, being free of morass, the locality has been well chosen for the establishment of a trading post. The settlement stands on the west side of the entrance of the creek and around it is a small cultivated space, which is most fertile in the production of all tropical fruits and vegetables. This end of the lagoon also abounds in turtle in the season.

"The position, indeed, has been found so favorably situated, and, comparatively, so healthy, that a bridle path has been opened along the west side of the Chiriqui Valley and across the mountains to Ciudad David, near the Pacific, by means of which cattle have been brought from thence to this spot and then conveyed in canoes to the Boca del Toro settlement in three days. The shore is here quite clear, and there is excellent anchorage in 7 fathoms about one-half mile distant. Numerous small streams descend from the table ridge into the west side of the lagoon, but the Robalo is the only one navigated by small canoes.

“ROBALO RIVER entrance lies near the southwest corner of the Chiriqui Lagoon, on the north side of a shallow mangrove bay, about 2 miles westward of Frenchman Creek. Although very narrow, it is navigated by the sarsaparilla pickers in their little canoes, two or three days' journey, according to the state of the river. At the end of one day's paddling rapids are met with, and after two days' ascent it receives a small stream from the southward, which throws so large a body of water into the main branch as to render it almost impassable after very heavy rains. The banks are said to be densely covered with trees of the largest dimensions.”

“WATER.—The best place in the lagoon to water is at Frenchman Creek. There is also an excellent and convenient spring in the little sandy bay on the east side of Bluefield Point, off which there is anchorage; it is, however, difficult to get at, and so exposed as to be dangerous with strong westerly breezes and land winds.

“DIRECTIONS—TIGER CHANNEL.—Vessels bound into the Chiriqui Lagoon with the sea breeze should approach by the Tiger Channel, which, between Tiger Breaker and the east end of Zapatilla Reef, is 4 miles wide. After passing southward of the breaker the opening into the lagoon is readily distinguished, and a course should be shaped to pass from three-fourths to 1 mile from the east end of Water Cay. From this a southerly course must be taken, until the west extreme of the Zapatilla Cays is in line with the eastern extremity of Water Cay, bearing N. 24° W. (N. 30° W. mag.), taking care to bring these marks on before Valiente Peak is in line with the south end of Toro Cays.

“Or, when the extremities of Water and Zapatilla cays are in line as above, a very small rock, 3 or 4 feet above the sea, close off the north side of Water Cay Point, will be seen just open of it, and this mark will lead between the shoals. When Valiente Peak is over a hut at the east end of a small sandy cay, on the east side of Bluefield Point, bearing N. 33° E. (N. 27° E. mag.), a vessel will be inside them, and may shape her course as convenient. It is necessary, however, to observe that it will not be prudent for a large vessel to go to the eastward of the Chirica Mola, to the entrance of which the leading mark, or the same course, will carry her.

“The rock off Water Cay lies so close to the point that it must be used very cautiously as a mark, and only when the

Zapatilla Cay is not seen. As the tops of the trees on the west end of the latter cay are only 80 feet above the sea, it will perhaps be necessary and safer to guide the vessel from aloft, so as to keep that mark in sight as long as possible instead of trusting to the rock and bearing.

“Great attention is requisite, for the water at entrance of the lagoon is so discolored that the shoals can not be seen, and as they are steep-to, with deep and exceedingly irregular soundings, the lead is almost useless, and there is only a space of about 400 yards to spare from the shoals on the west side of the channel.

“There is another channel to the westward of the above, full three-fourths mile wide from east to west, but so difficult of access, for want of marks, that without the assistance of a pilot it is dangerous to navigate. However, with some local knowledge the following directions will assist to guide safely into the lagoon in a case of necessity:

“Pass three-fourths mile eastward of Water Cay, and when Water Cay Point bears W. (S. 84° W. mag.) steer S. 23° W. (S. 17° W. mag.) until it bears north (N. 6° W. mag.), thence a south (S. 6° E. mag.) course will lead through between the shoals at the distance of about 800 yards.

“If bound to the southwest part of the lagoon, when Valiente Peak is in line with the north side of Bluefield Point, a course as most convenient may be pursued; but if bound to the Chirica Mola, it will be necessary to stand on until Valiente Peak bears N. 39° E. (N. 33° E. mag.) or Popa Hill N. 35° W. (N. 41° W. mag.), when a S. 51° E. (S. 57° E. mag.) course will lead to the entrance of that river.

“In leaving the Chiriqui Lagoon it will be necessary to wait for the land wind, either in the evening—if it comes off early, which it very frequently does—or in the morning, soon after daylight. To run through the eastern channel the leading mark must be brought on from a position well to the southward, with Valiente Peak bearing to the northward of N. 34° E. (N. 28° E. mag.). Steer out, with the east end of Water Cay in line with the west end of the western Zapatilla Cay, N. 24° W. (N. 30° W. mag.), and when Valiente Peak comes in line with the east side of Bluefield headland, N. 45° E. (N. 39° E. mag.), you will be between the outer shoals, and a north (N. 6° W. mag.) course will lead clear out to sea.

“To run by the western channel, the east point of Water

Cay must be brought to bear north (N. 6° W. mag.) (the course through) before Mount Popa bears westward of N. 35° W. (N. 41° W. mag.). When Valiente Peak is seen over Little Toro Cay, N. 56° E. (N. 50° E. mag.), the shoals will be cleared, and a course to sea may then be shaped.

"Should it be necessary to work up from the west end of the lagoon, the north shore must be approached very cautiously, for no marks can be given to avoid the shoals off that side. As the south side can be navigated by the lead, it will be better not to stand more than about halfway across from that shore, until the leading marks for the channels are nearly on.

"TIDES.—It is high water, full and change, about noon, and the spring rise in the Chiriqui Lagoon is about 1 foot. In the interior of the lagoon there is seldom any tidal stream, but an outset to the northward, according to the state of the rivers. In the dry season, from March to June, off the Chirica Mola, and as far out as the entrance of the main channel, the strength of the ebb is from one-half to 1 knot an hour, and there is sometimes a weak flood stream; but outside and in the small channels to the westward there is a continual outset, running at the rate of 1 or 2 knots, and after long heavy rains even as much as 3 knots, in the main channel.

"BLUEFIELD POINT, 3 miles S. 30° W. (S. 24° W. mag.) from Cape Valiente, is a bold bluff wooded headland 180 feet high and easily recognized. About 200 yards to the westward of it there is a small black rock, 6 feet out of water, the western side of which, as well as the southwest extremity of the bluff, is steep-to.

"From abreast the black rock a sandy beach, backed by mangrove swamps, trends about northeast 600 yards, and from the north end a dry coral ledge extends about 200 yards to the Little Toro Rock.

"TORO CAYS, about one-half mile westward of Little Toro Rock, are small islets, lying so close together that they generally appear as one narrow island, about one-fourth mile in length, from north to south. They are formed of dark indurated clay, in which are embedded thin spiral layers of pebbles and stones, and their summits are covered with wood. From a northeast and southwest direction the southernmost of these cays are seen to rise perpendicularly from the sea, and have a similar appearance to those off Cape Valiente.

The ground is all foul inside of them, and a ledge extends from the northernmost north-northwestward 400 yards. There are 5 fathoms at 400 yards to the westward.

“BLUEFIELD ROCK, a small perpendicular black rock 32 feet high, with two or three remarkable trees on its summit, is easily recognized from the westward; it lies on the south edge of the Valiente bank, 800 yards to the northward of Creek Point, and marks the narrowest part of the channel into Bluefield Creek.

“BLUEFIELD CREEK, on the south side of Cape Valiente, is $4\frac{1}{2}$ miles in extent, east and west, but the south side of the creek is so indented that its breadth varies considerably. The narrowest part of the entrance is 800 yards across, but within it is nearly $1\frac{1}{4}$ miles wide in some places and has a depth sufficient to receive vessels of large draft in perfect security. There is no bar.

“The interior is exceedingly picturesque. The vessel will appear to lie in a deep valley, the gorgeous densely wooded hills rising on the north side to the Valiente Peak and on the south side to an elevation of 180 to 500 feet. The eastern end is swampy and bounded by low mangroves. From the northeast end a pathway leads across the narrow isthmus which connects the peninsula to the main, and at the south-east end a small narrow ridge of irregular hills rises to the height of 640 feet.

“On the south shore of the creek, in a small plain to the eastward of Carolina Point, there is a small stream of excellent water, and all around the Valiente Peninsula may be seen the detached huts of the Valiente Indians, with small cultivated spots here and there. The huts of this tribe will be elsewhere met with, scattered around the adjacent lagoons and at the entrances of the small rivers on the coast, but this is the only spot where they appear to have formed a regular settlement; sometimes, however, the peninsula will be found entirely deserted, for in their long fishing and hunting excursions they are accompanied by their whole families.

“SCRUBBY POINT, the southwest entrance point of Bluefield Creek, is low and woody. It is the northeast extremity of a narrow neck of land three-fourths mile in length, which terminates to the southwest at Bluefield Point, the east point of entrance to the Chiriqui Lagoon.

“SUPPLIES.—Water may be obtained from the stream on the

south shore, from which a shallow flat extends some distance, but by means of a long hose the water can be conveyed into the boats. Wood will be found all around, but, when time is not an object, it will be better to proceed to the Zapatilla Cays for this purpose, where there will be less risk to the health of the crew. The seine may be hauled with great success in any of the sandy bays, but it is necessary to be prepared to meet with small alligators and to be careful that the people are not electrified by the torpedo.

“The papaw, a most excellent vegetable, grows almost wild all around the inlet, and the banks of several of the streams on the main afford an abundant supply of bananas and plantains. There is also fair hunting, but it is attended with some risk. The dense rank underwood is infested with snakes of the most venomous description, and a season seldom passes without a fatal accident occurring among the sarsaparilla pickers.

“DIRECTIONS.—The extremity of the Torro Ledge is about west of Scrubby Point, and from it to the nearest point of Valiente Bank the channel into Bluefield Creek is a mile wide, with 11 to 18 fathoms water, except about midway, where there is a depth of 8 fathoms. Both the edge of the Valiente Bank and the opposite bold projecting points which separate the bays are steep-to, but the bays themselves are very shallow within the lines of the points.

“Vessels having occasion to visit Bluefield Creek had better enter by the Tiger Channel, taking care in so doing to give the Tiger Breaker a wide berth and not to haul in to the southward until the Toro Cay bears eastward of S. 11° E. (S. 17° E. mag.). By waiting until the sea breeze is established the channel may be navigated without the necessity of making a board. Steer toward Bluefield Point, taking care not to bring it to bear westward of south (S. 6° E. mag.) to avoid the edge of the Valiente Bank, until the hummock on the south end of the Bluefield Ridge at the head of the creek is in line with Carolina Point, S. 74° E. (S. 80° E. mag.).

“This mark will lead nearly in mid-channel to the narrowest part, when the anchorage may be steered for. It will be better, however, not to go farther in than to bring Cape Valiente in line with a remarkable bluff named Observatory Point, which lies a short distance to the southward of it, and anchor in 11 fathoms, mud, with a large hut on the summit

bearing N. 23° W. (N. 29° W. mag.), and Bluefield Rock about N. 69° W. (N. 75° W. mag.). A position to the eastward of this loses the advantage of the breeze, by no means desirable in so confined a valley and in such a fearful climate as this.

"A bank of 2 fathoms is chartered in mid-channel just within Carolina Point, with deep water on either side; and there are several shallow patches farther in, with deep water between them.

"TIDES.—It is high water, full and change, in Bluefield Creek at 12h. 30m., and the rise is about a foot. There is no perceptible stream on the flood, but the ebb will assist a vessel in working out.

"VALIENTE PEAK.—From Cape Valiente, the northwestern extremity of the Valiente Peninsula, to Chiriqui Point a rocky shore extends easterly $2\frac{1}{2}$ miles, and bold, irregular, densely wooded hills rise abruptly from the shore to the height of 500 or 600 feet. On the western shore of the peninsula and about a mile southeastward of Cape Valiente one of these hills terminates in Valiente Peak, 722 feet high, which, being much higher than any other summit on this part of the coast, is a most remarkable object and excellent guide from a long distance.

"VALIENTE CAYS.—From Cape Valiente the western face of the promontory turns sharply in a southeast direction for $1\frac{3}{4}$ miles and is fronted by a shallow coral bank extending $1\frac{1}{4}$ miles. The north side of this bank is bounded by a range of small islets and rocks, forming the southern side of the Valiente Channel, which is here $1\frac{1}{2}$ miles broad. Near the western edge of the bank there is also a small low rock, named Middle Rock, with sunken rocks between it and the cays.

"These islets and the Tiger Cays appear to be of precisely the same formation as those lying close off Escudo de Veragua. Those off Cape Valiente are equally remarkable, being perforated in the same way and crowned with coconut trees. They appear to be wasting from the action of the waves, and one has been washed away.

"CHIRIQUI ROCKS.—From Chiriqui Point a coral ledge called Chiriqui Rocks extends about west-northwest $1\frac{1}{2}$ miles, and terminates at 400 yards beyond Barren Rock, 10 feet high, within which are several rugged, rocky islets from 50 to 150 feet above water.

“VALIENTE CHANNEL, between Barren Rock and the Tiger Cays, has depths of 6 to 9 fathoms on either side of Valiente Breaker.

“VALIENTE BREAKER, N. 35° E. (N. 29° E. mag.), $1\frac{1}{2}$ miles from the extremity of Cape Valiente, is a very small head of 3 fathoms, steep-to, which breaks heavily when rollers prevail, even in the finest weather, and is extremely dangerous. Between it and Barren Rock there are depths of 10 and 11 fathoms, and between it and the Tiger Cays the channel is three-fourths mile wide, with 6 to 9 fathoms.

“TIGER CAYS, which bound the north side of the Valiente Channel, consist of three small red-clay islets about a mile in extent from east to west. The easternmost and largest lies $1\frac{1}{2}$ miles from Cape Valiente, and is covered with brushwood, but on the others are trees with their tops about 35 feet above the sea. The cays are connected and surrounded at a short distance by a coral ledge, almost dry, preventing landing anywhere, although it is steep-to.

“TIGER ROCK.—At 1,200 yards N. 64° W. (N. 70° W. mag.) of the westernmost of the Tiger Cays lies Tiger Rock, a small detached rock 6 feet above the sea and steep-to, having 14 fathoms water between.

“TIGER BREAKER, 800 yards N. 71° W. (N. 77° W. mag.) of Tiger Rock, is a small isolated breaker, also steep-to and extremely dangerous, for it does not always show itself. From Tiger Breaker Valiente Peak and Cape are in line and Toro Cay bears S. 3° W. (S. 3° E. mag.).

“DIRECTIONS.—The widest channel is westward of Valiente Breaker and between it and Tiger Cays.

“Little Toro Rock, a sugar-loafed islet 100 feet high, in line with or open of Cape Valiente, bearing S. 33° W. (S. 27° W. mag), leads westward of the breaker in about 9 fathoms. When Barren Rock bears N. 85° E. (N. 79° E. mag.) keep it astern on that bearing until Bluefield Point bears S. 5° E. (S. 11° E. mag.), then steer for it. This mark will lead westward of Valiente Bank and up to the leading mark for Bluefield Creek. If proceeding into Chiriqui Lagoon, pass about 1 mile westward of Toro Cays and follow the directions given for Tiger Channel.

“The flood stream in Valiente Channel is charted as running one-half knot an hour to the southwest and the ebb from 1 to 2 knots in the opposite direction, the strength of the lat-

ter being caused by the easterly current and the outset from the lagoon. This increases the swell, which is generally so heavy that it is by no means a safe channel to work out of nor for a stranger to enter, for the break over the Valiente Rock may not occur for long intervals.

“VALIENTE PENINSULA.—From Chiriqui Point the shore trends about southeast 5 miles to Tobobo Bluff, which forms the southeastern extremity of the Valiente Peninsula, having on its northern side a small cove with bold irregular hills rising from it all along. The beach is of white sand, skirted by small islets and detached rocks and reefs to the distance of 200 to 400 yards, upon which the surf breaks furiously. It is remarkable that this is the first clear white sandy beach met with to the westward of Chagres. Elsewhere, as far to the westward as Greytown, the beaches are composed of dark, almost black, ferruginous sand, which is so impregnated with minute metallic particles that a magnet thrust into it will frequently be brought out completely coated with them. The only exception is the above beach and the sea or northern sides of the outlying cays and islands, which are bounded by beaches of pure white calcareous sand.

“It is also remarkable that the beach of the Mosquito shore northward of Greytown is in many parts similar, except that the sparkling appearance seen there is owing to small particles of mica, which at first sight have been mistaken for gold dust.

“PLANTAIN CAY, northeastward 1 mile from Tobobo Bluff, is a small but remarkable wooded islet, rising abruptly from the sea to the height of 230 feet, and between it and the bluff there is a similar cay, named ‘Tobobo,’ but only 150 feet high. Between these cays there is a narrow channel, adapted for coasting vessels. Plantain Cay has some small rocks, steep-to, close off its north side.

“TOBOBO BANK, $5\frac{1}{2}$ miles eastward from Plantain Cay, is a small coral bank with 7 to 10 fathoms water, which tops with heavy rollers and is exceedingly alarming; and N. 51° E. (N. 45° E. mag.) $5\frac{1}{2}$ miles of the cay there are 10 fathoms, on a narrow coral ledge, with 16 to 17 fathoms, which lies just within the edge of soundings and has 30 fathoms inside it. Vessels should approach this neighborhood with great caution.

“TOBOBO BIGHT.—From Tobobo Bluff, a bold prominent headland 500 feet high, the shore trends to the southeastward

and eastward to Old Bess Point and forms a deep irregular mangrove bight. The inner part of this bight is very shallow and skirted by a dangerous reef, which breaks heavily about a mile from the shore and is steep-to. There are several small openings, however, forming boat channels into Tobobo Creek, in the northwest corner.

"There are two huts on the south side of Tobobo Bluff and a spring of good water in a small sandy cove to the northward of them.

"From Old Bess Point the coast trends about southeast 3 miles to Coco Plum Point, which is about a mile to the north-northwest of the entrance of the Caña and is fringed with a reef to a considerable distance. About midway, close to the shore, there is a small cluster of islets named the Tooley Cays, and abreast them the wooded land rises to the height of 460 feet.

"ESCUDO DE VERAGUA is an island $2\frac{1}{2}$ miles long from east to west and about three-fourths of a mile broad, and its southwestern extremity lies east-northeastward 10 miles from Coco Plum Point, the nearest part of the mainland. It is low and woody, and the trees grow so very regular in height that when first sighted it appears like a small island of tableland which, when approaching from the northward, will be seen to slope down gradually to the westward. The eastern part of the island is formed of soft, reddish-brown, perpendicular cliffs from 40 to 50 feet high, in which are embedded several species of marine shells.

"From the destructive action of the waves, however, the cliffs have been cut into and separated here and there at very short distances from the body of the island, forming small islets; some of them have been pierced through, and the arches, being crowned by dense foliage and trees from 70 to 80 feet high, have a most remarkable and picturesque appearance when seen from a short distance. The west end and south side of the island are very low and swampy and bounded by a dark sandy beach, similar to that found on the mainland. The southwestern extremity is steep-to and affords the only landing place, which, however, is at most times difficult of access on account of the heavy surf. From the west end a reef extends about 200 yards, and also skirts the north shore at a distance of one-fourth mile and the east end one-half mile outside the little clay islets; from the middle of the south side a ledge extends about one-half mile.

“During the rainy season several small rivulets force themselves through the sand on the south side of the island, but the supply of good water is so scanty that the few fishermen who visit it in the turtle season are obliged to dig wells

“ANCHORAGE.—A vessel may anchor off the southwest end of Escudo de Veragua, but will ride extremely uneasy, and not at all times safe; for although the soundings show a sandy and gravel bottom, it is but a thin stratum over a flat shelf of coral, which does not afford good holding ground. Should it be necessary to take shelter here, the west end should be rounded in a depth of not less than 8 fathoms, and a berth taken wherever the sea appears the most smooth, in about 10 or 12 fathoms, taking care, however, to leave plenty of room for dragging or weighing with the land breeze, which sometimes comes off suddenly with considerable force.

“TIDES.—There is a rise of tide of from 1 to $1\frac{1}{2}$ feet at the island of Escudo de Veragua. In the daytime, at the anchorage, the current generally has a westerly set, which ceases at night.

“BANK OF SOUNDINGS.—The regular bank which skirts the main forms, to the eastward of Escudo de Veragua, a large tongue, extending from the island in an east and northeast direction about 8 miles and to the northward 5 miles, with a tolerably regular increase in the depth; but to the northwestward the soundings are irregular, as about 3 miles distant they change rapidly from 30 to 10 and 14 fathoms. They are also irregular to the southward, but there is no danger, and a vessel may work to the westward quickly, between the island and the main, by means of the eddy, which generally runs in that direction.

“CAÑA RIVER.—The Caña separates the territories of Chiriqui and Veragua. The entrance is S. 60° W. (S. 54° W. mag.), 11 miles from the northwest point of Escudo de Veragua, and readily distinguished by two huts, one on either side; that on the western point is more like a house, and, being generally whitewashed, is a conspicuous object. About 5 miles from the mouth, in a southerly direction and near the foot of the Tiger Spur, there is a small village inhabited by Indians who are employed in grazing cattle, collecting sarsaparilla, and washing for gold dust, which is occasionally brought down in small quantities. Small canoes can navigate the stream thus far, but the northeast swell rolls in so

heavily that the passage of the bar is only safe in very favorable weather.

“THE COAST.—From the Caña a low sandy shore extends about southeast for 19 miles to Buppan Bluff. About 3 miles westward of the bluff is the entrance of Pedro River, and about the same distance farther on is that of the Chiriqui. Both are very small, and can only be entered by canoes after heavy rains.

“Eastward of the bluff the shore forms a sandy bay $2\frac{1}{2}$ miles long, through the middle of which a small stream clears an opening for its exit in heavy rains. From the bay to the entrance of the Passiowla a ridge of red cliffs extends to the eastward, skirted by a beach and crowned by a clump of remarkable flat-topped trees about 200 feet above the sea. From the Passiowla to Coaita Point the usual sandy beach is intersected by two low rocky shelves. About midway a coral ledge extends about one-fourth mile and is steep-to. In this space four small streams descend from the Catalina Hills, the easternmost of which is visited by sarsaparilla pickers in small canoes. The Passiowla is also navigable for small canoes for a short distance after the heavy rains, but at other times the mouth is blocked by a dry sand bar.

“BUPPAN BLUFF.—The west end of the above beach terminates at the base of a large bold promontory, formed by two bluff headlands close together, and a third, about $1\frac{1}{2}$ miles westward of them, named Buppan Bluff. All three rise precipitously from the beach in round cones to an elevation of from 700 to 800 feet only one-fourth mile inland.

“LANDING.—From Buppan Bluff a small dry ledge extends about 400 yards, under the lee of which, in moderate weather, there is a landing place.

“TIGER HEAD.—At about 11 miles westward of Buppan Bluff a large spur extends in a northwest direction, which gradually descends with a long slope into the plain; a little below the summit, 3,882 feet above the sea, there is a small projection called the Tiger Head, but more like the ear of that animal, which is most remarkable when seen from the northwest and northeast quarters, and being generally visible when the higher summits behind are clouded, it is a useful landmark.

“KING BUPPANS PEAK.—The south side of the easternmost hill descends with a slight gradual slope about $2\frac{1}{2}$ miles to the southeast, when it rises suddenly to the summit of a

narrow conical hill 2,846 feet high. It then forms, between the summit and a much higher ridge behind, a deep, hollow notch, which is a most remarkable feature, although backed by the loftiest part of the Cordillera, which reaches an elevation of 7,140 feet at about 15 miles from the coast.

"The name 'King Buppans Peak' has been given to this hill by the Mosquito Indians, who, it is said, penetrated thus far in one of their marauding excursions, accompanied by their king. From the island of Escudo de Veragua, distant 22 miles S. 15° W. (S. 9° W. mag.), it is a most conspicuous object among the neighboring heights.

"COAITA POINT, which lies under the northeast angle of the Catalina Hills, is low and sandy, and the most southern point on this side of the Isthmus of Panama.

"NO ANCHORAGE.—From this point to the Chagres, a distance of 83 miles, the shore runs nearly straight, without any sheltered anchorage whatever; and, indeed, without safe landing except in native boats under favorable circumstances, at spots known to the coasters and fishermen, for heavy surfs break continually along the whole shore. Abreast Coaita Point the edge of soundings is about 6 miles distant, and the depths will be found regularly decreasing to the shore, which is generally bold and clear.

"CATALINA HILLS.—The deep valley through which the rivers Candelaria and Calawawa run is about 4 miles wide, and is also well marked; its western side is formed by the Catalina Hills, a large mass of irregular rounded heights, rising abruptly from the shore to an elevation of 1,738 feet, and its eastern side by a ridge, with a gradual rise to a height of 2,600 feet southeastward 5 miles from the Calawawa.

"CALAWAWA RIVER.—The distance between the Calawawa and Candelaria is only $1\frac{3}{4}$ miles; and between there is a small ridge of red cliffs. The former stream discharges through the breach, and the entrance is pointed out by two cocoanut trees on the western point and by some red cliffs topped with trees about three-fourths mile to the westward.

"The Calawawa is navigable for canoes about 20 miles, and beyond this a footpath or bridle road leads over the mountains to the capital of the province. The journey may be performed in about thirty-six hours, and the mode of conveyance is on the shoulders of Indians, who accomplish it with great ease and rapidity, even in the midst of incessant torrents of rain, which prevail at almost all seasons.

The red cliff westward of the Calawawa is skirted by a coral ledge, extending off about one-fourth mile. From thence the beach extends westerly for $2\frac{1}{2}$ miles to Coaita Point.

"A mile westward of the above-mentioned cliff the sand projects out a little to a point, from which a ledge extends off one-fourth mile, and shelters a landing place to the westward of it, near a hut on the beach.

"CANDELARIA RIVER.—On each point of the entrance there is a single cocoanut tree, and on the western point there are also two or three huts; it is also further marked by a house standing on a slight elevation just above the mouth of the river:

"THE COAST.—Three-fourths of a mile to the eastward of Candelaria River is a bold, rocky headland, close under which lie two little rocky islets having foul ground one-fourth mile outside. The shore then extends $1\frac{1}{2}$ miles to the eastward, presenting dark, sandy beaches, separated by small rocky shelves, when it terminates at the base of a range of most remarkable cliffs, which rise boldly from the sea to the height of between 100 and 200 feet and extend $2\frac{1}{2}$ miles in a westerly direction. These cliffs appear to be composed of red indurated clay impregnated with minute metallic grains, which have become so highly polished by attrition of the water unceasingly trickling over them from the highlands in the rear that when the sun shines on them from a low altitude a most dazzling appearance is produced. They sometimes look like the white sails of a vessel, and the easternmost has been likened to the stern of a large ship. They are certainly most striking objects and valuable guides to the coasters.

"From these cliffs the shore trends easterly $1\frac{3}{4}$ miles to Wasora River; it is sandy and intersected by two rocky shelves. From the entrance of the Wasora, which is very small, the coast curves slightly to the northeastward for about 2 miles to a bluff which lies a short distance westward of the Coccoyah River. The shore is a sandy beach, divided in the middle by a small rocky point.

"ZAPATERO POINT is low and sandy and breakers extend from it about one-half mile. At $1\frac{1}{2}$ miles beyond the point is a very remarkable red cliff 100 feet high. At $1\frac{1}{2}$ miles to the eastward of the cliff the Gold River empties, and from here the shore trends about east-northeast for 4 miles to the west entrance of St. Christopher Bay, and is sandy and skirted by

a ledge, which breaks nearly one-half mile off. About midway the beach projects a little, and near this spot there is a solitary hut. About one-half mile to the eastward of the Gold River the beach is broken by a small low rocky point.

“GOLD OR CONCEPTION RIVER.—There is said to be a gold mine near the source of this river, from which it is named. The entrance may be distinguished by a remarkable umbrella-shaped tree standing on rising ground on the eastern bank, to the eastward of which, on a small cleared spot, there is a house, and below it on the beach are two cocoanut trees at the mouth of the river. The opening of the valley is also very conspicuous.

“CASTLE CHOCO is a remarkable mountain, rising almost perpendicularly on its northern face from the plain to an elevation of 6,342 feet; the flattened summit has the exact appearance of a huge square castle, with a small tower at one angle. It is, however, so constantly enveloped in clouds as to be seldom visible, except at the break of day, just before sunset, or on a sudden cessation of heavy rains, when the atmosphere will almost instantly become most remarkably bright and clear; and these remarks are applicable to all the highlands on this coast.

“When visible the castle is, of course, an excellent guide for the mouths of the small streams to the westward of the Coclet; it is also to be seen, under favorable circumstances, from the castle of San Lorenzo, at Chagres, west, distant 67 miles.

“From the base of Castle Choco irregular masses of wooded hills begin to rise, and, taking a northwest direction, reach an elevation of 3,100 feet only 5 miles south of the Coccoyah. Thence the base of the Cordillera almost bounds the shore, as far as its northwestern extremity, near the meridian of the Chiriqui River, 35 miles to the westward of Zapatero Point.

“CORDILLERA OF VERAGUA.—Between the Coccoyah and Belen rivers the interior is comparatively low, forming a deep valley for some distance to the southeastward, and the land declines in height toward the coast, where it is elevated about 150 feet; but only 2 miles to the southward of the Coccoyah the northeastern extremity of the base of the Great Cordillera of Veragua rises abruptly 1,044 feet. The highest ridge in this immense mass of mountains traverses the Isthmus from

east to west, for about 70 miles, at the distance of about 15 miles from the coast.

“The Saddle de Veragua, the eastern extremity of the ridge, rises from the low plain of Panama, south, about 20 miles from the entrance of the Coclet River, and, when seen from the northwest, forms a remarkable double peak or saddle 3,326 feet high.

“ST. CHRISTOPHER BAY.—To the westward of Palisado Point the shore forms a sandy bay $2\frac{1}{2}$ miles wide and a mile deep, into which Old Veragua River empties.

“The river has a hut on the east point of its entrance, and on the rising ground on the west side, in the center of a cleared space, having the appearance of a green plain, there is a conspicuous white house.

“THE COAST.—From Palisado Point, off which breakers extend one-half mile, the shore extends easterly for $1\frac{1}{2}$ miles in a straight sandy beach, then is rocky for about one-half mile to the Belen River, the opening to which is so small that it is only recognized by the receding of the low hills which form its valley. About 4 miles farther on is the entrance to the Palmillo, which is pointed out by two huts on the eastern side, but is so hidden by dense foliage that it is extremely difficult to find. From this river to Rincon Point the shore trends about northeast for 6 miles and is a sandy beach, intersected by low rocky shelves; the land near the shore gradually declines in height.

“RINCON POINT is a bold, scarped, rocky headland, reaching the height of 550 feet three-fourths of a mile inland. At 3 miles south of it the elevation is 800 feet. Abreast this headland the edge of soundings is only $2\frac{1}{2}$ miles distant, and the shore is so bold that there are 24 fathoms one-half mile off.

“COCLET RIVER AND MOUNTAIN.—The Coclet River is pointed out by two huts on the west point of entrance and a house in the middle of a small cultivated spot on the east side. Behind it rises the Sierra de Coclet, which, at 4 miles to the southward of the river entrance, reaches an elevation of 1,432 feet. This large mass of irregular hills is connected with the Sierra de Miguel de la Borda by a wooded ridge from 800 to 900 feet high. A little to the eastward of the Coclet the base of the sierra rests on the shore, and continues to bound it until interrupted by the valley of the Plantain River.

“From the Coclet the coast trends about east-northeast 11

miles to the entrance of the Mangalee, and is bounded by a sandy beach, intersected occasionally by small patches of low rocks. About 5 miles from the Mangalee a slight bay is formed for about 2 miles, into which the Plantain River flows; the entrance is marked by a single hut on either side and the deep valley through which it runs.

“MANGALEE RIVER.—From the entrance of Mangalee River, which is pointed out by two or three huts on the west side and a little low rocky point on the east side, to the village of Gicacal, the sandy shore, backed by low rocks, extends for $2\frac{1}{2}$ miles.

“The whole line of shore between these points is fringed with coral, to a distance of from 200 yards to one-half mile, upon which the sea breaks, rendering landing extremely difficult and dangerous, except under most favorable circumstances.

“All the streams from the Mangalee to the Indios are navigated by small canoes, conveying the sarsaparilla collected on their banks to the small trading vessels which occasionally call for it.

“The Mangalee defines the northwestern boundary between the provinces of Veragua and Panama.

“ANCHORAGE.—There is temporary anchorage all along the coast just described, in 6 to 8 fathoms, sand and mud, about 2 miles from the shore.

“PILON DE MIGUEL DE LA BORDA.—This remarkable isolated mountain, 1,669 feet high, is situated southwestward 28 miles from the mouth of the Chagres and about 14 miles inland. It is not, however, often visible, being generally concealed by the dense vapors which hang over the extensive low, flat surrounding plain; still it may be occasionally seen from the Chagres anchorage.

“ASPECT.—Immediately behind the entrance of the Mangalee the base of Sierra de Miguel de la Borda attains, almost abruptly, the height of 592 feet, whence it continues to rise in irregular densely wooded ridges to the summit, which is 1,552 feet above the sea and S. 18° E. (S. 23° E. mag.) 5 miles from the entrance of the river. The Pilon de Miguel de la Borda lies southward and eastward of Giscal village, but is not visible to the westward of it. Abreast the middle of the red cliffs, eastward of Gicacal, there is a conspicuous round hill 356 feet above the sea. Near the entrance of the Indios

the land is about 150 feet above the sea, and to the westward it gradually rises.

"THE COAST from the Mangalee River extends about east-northeast for 14 miles to the Indios River. About $2\frac{1}{2}$ miles to the eastward of the Mangalee River is the village of Gicacal, which consists of a few straggling huts on the left bank of a small stream. Half a mile to the eastward of the village is a remarkable ridge of low red indurated mud cliffs, which extend for about 3 miles; thence to the Indios cliffs the shore for 2 miles is a low rocky shelf, upon which will be seen a few huts, and then a sandy beach. About one-half of a mile to the westward of the river is a remarkable cavern in the cliff, and at the same distance to the eastward is the village of Salud. From the river to Lagarto village the shore is low, sandy, and thickly wooded behind. At 4 miles northeastward of the village is Diego Point. From here the land gradually ascends to the base of the Chagres table-land. Diego Point is formed by a low rocky shore, and about a mile to the westward of its extremity is a remarkable white cliff, with a small sandy beach on either side, above the western end of which there is a cleared space and grazing farm. Morrito Point is formed by a low red cliff, upon which are a few huts, and foul ground extends from it about 400 yards.

"From El Morillo, a little rock about one-half of a mile eastward of Morrito Point, the shore is rocky and foul to Arenas Point, at the entrance of the Chagres River, with Boca de la Furnia Point in between.

"CHAGRES RIVER.—The flat rocky promontory which bounds the north side of the entrance to the Chagres River is about 400 yards in length east and west and about 175 yards broad. On the north, west, and south sides it rises almost perpendicularly from the sea to the height of 82 feet at the outer end and to that of 100 feet at the inner part. The western part is occupied by the fortifications of San Lorenzo, now in ruins, immediately in the rear of which there is a level plateau 300 feet in length, terminating at a little mound commanding the valleys on all sides and the only road to the castle. The works are everywhere in a state of decay and the buildings almost in ruins.

"The south side of the entrance to the river is formed by a dark sandy beach, and from Arenas Point to the base of the promontory opposite the width is 225 yards. From the inner

end of the promontory the shore turns suddenly to the southward, and abreast Arenas Point the river is only 100 yards wide.

"The bar has 11 feet of water in the dry season, but the depth changes according to the state of the river. The mouth of the river, outside the bar, is obstructed by the Laja Reef, a rocky ledge about 50 yards in diameter, which breaks in heavy weather and is nearly even with the surface of the sea. The best approach is northward of Laja Reef in depths of 14 feet over a breadth of about 70 yards. Within the bar the water deepens to 17 to 20 feet abreast the town, which is 200 yards above the bar. Here is the anchorage for vessels that can enter. Small craft also lie alongside the bank of the river southward of the town, as the shore at the town is a rocky ledge.

"Reefs nearly awash, one-fourth of a mile in extent, which also break during strong winds, lie from one-third to one-half of a mile westward of Arenas Point, with shallow water extending toward the Laja. The passage between, though with 14 feet of water, is narrow and not recommended.

"CHAGRES.—The town of Chagres is on the eastern shore, between the Castle and Caño Rivulet, which enters the river abreast Arenas Point. The shore in front is skirted by a flat rocky ledge, so that small craft find it more convenient to lie alongside the bank just above the Caño. Since the completion of the Panama Railroad Chagres has become simply a fishing hamlet and retains no evidence whatever of its former size and importance. A few thatched huts and a population of 200 souls comprise the whole.

"ANCHORAGE.—The anchorage off Chagres is an open roadstead, exposed from northeast, round northerly to southwest. In the latter direction, however, it is somewhat protected by the distant land and bank of soundings; but in strong winds from between west and northeast remaining here is attended with risk, and it will be better when the weather threatens from these quarters to put to sea or proceed to either Colon or Porto Bello. A good berth will be found with the castle of San Lorenzo bearing S. 56° E. (S. 61° E. mag.), and the rock of Mogote de Brujas just open of the bluff N. 45° E. (N. 40° E. mag.) in 10 fathoms, mud, about 1½ miles from the shore, but a position farther in may be taken if necessary.

“CURRENT.—The current usually sets northeastward with a velocity of about 1 knot an hour.

“GENERAL DIRECTIONS—APPROACHING COLON AND CHAGRES.—Approaching from the northeast in the season of the breezes, from November to May, the first land seen will be most probably the lofty flat mountain ridge of Llorona, overlooking the harbor of Portobelo from the southward, at the height of 3,000 feet. The shore is very low to the westward of Portobelo until it reaches the little flat peninsula of Chagres, and it is of the same character to the westward of that river for a distance of about 25 miles; therefore the locality is well marked by the peninsula and easily made out. The interior is so generally shrouded by the rains and deadly vapors arising from the swamps that the inland chain of the Calderos Altos is seldom visible. The Sierra de Llorona is also frequently obscured, but the irregular hills which inclose Portobelo are generally unclouded, and, being from 600 to 1,300 feet high, are sufficiently remarkable to be distinguished from the much lower table-land of the Chagres Peninsula.

“As the land back of Manzanillo is high and can be seen from 40 to 60 miles off, according to the state of the atmosphere, it forms a splendid landmark, and no allowance for the easterly set is made by most of the captains of mail steamers; as, should the current happen to be slight or no current at all be encountered, as sometimes happens, and allowance were made for the easterly current, a vessel would make the low land to the westward of Colon, where it is difficult to recognize. By making no allowance, a vessel is sure to make the high land of Manzanillo, or that between Manzanillo and Colon.

“The islands off Manzanillo Point are nearly all covered with trees and can not be easily distinguished until after a vessel is within a few miles of the coast; but the large bare rock, Farallon Sucio, the largest islet of the group of this name, is a splendid landmark from all directions and can readily be distinguished, since it is comparatively bare of vegetation. It is not unlike in appearance to Green Island, off Portobelo; but the latter, being covered with trees, can not be distinguished from the mainland at a distance, and, besides, it is much smaller and not so far offshore as Farallon Sucio.

“Captain Lima, of the Pacific Mail steamship *Newport*, states that in 90 voyages from New York to Colon he has always made Sucio, off Manzanillo Point, bearing S. 16° W. (S. 11° W. mag.) to S. 19° W. (S. 14° W. mag.), even in the rainy season, when no observation could be obtained. His invariable rule is to change his course, so as to allow for the easterly set near this coast, as soon as he sights logs, trees, and driftwood. At his speed of 12 knots he allows one-half to three-fourths of a point, according to the quantity of driftwood encountered. If the quantity of driftwood is very great and the discoloration of the water very marked, he sometimes allows as much as 1½ points. If he encounters no drift he makes no allowance and assumes that there is no current.

“Off Manzanillo Point numerous tide rips have been observed and the current found to be 1½ knots per hour setting eastward. A current close in to the coast, as strong as 2½ knots per hour, has often been found.

“In the other part of the year, when calms and variable winds prevail and the easterly current is most powerful, it will be better to keep an offing from 30 to 40 miles and to make the coast even to the westward of Chagres. By doing this a vessel will not only avoid the strength of the current, but in a great measure escape the heavy rains and violent squalls from the shore.

“In this case the locality of the river is pointed out by a remarkable piece of flat wooded tableland, about 3 miles in diameter, which lies not far inland on the west bank of the river. Its north side rises rather abruptly to a height of 800 feet, and the elevation of its summit does not alter more than about 30 feet in its whole extent. There is nothing like it in the neighborhood. The land behind Chagres being higher than at the entrance, the castle is not seen from the westward until within a short distance.

“In leaving Chagres or Colon and bound to windward it will be, of course, advantageous to work or run alongshore in the influence of the great eddy stream, which generally reaches as far up as Cartagena. In the season of the variables and hazy weather, however, great care is requisite, particularly at night, for the stream runs close to the islets of Portobelo, and both hand and deep-sea leads should be well attended. It is also necessary to warn the navigator to be

well prepared to meet the violent gusts from the high lands at this period and to anchor should it fall calm.

“COAST.—From the bluff at the entrance of the Chagres River to Brujas Point the shore extends nearly straight north-northeast 3 miles, and is rocky and steep-to. About midway, however, there is a small rocky cove, into which a rivulet falls over the cliff from a height of about 30 feet. The water is excellent, but the heavy surf prevents landing anywhere near it.

“On the north side of the bluff of Chagres there is also a small sandy cove named ‘Laja,’ about 200 yards wide and having a depth of 15 feet close to the beach, into which a little stream flows at the southeast corner, by the side of the precipice. The north side of this cove is bounded by a bold irregular bluff headland, rising to the height of 120 feet, and, being higher than the bluff, hides the castle of San Lorenzo from the northward until the latter is brought to bear S. 17° E. (S. 22° E. mag.).

“Brujas Point is a bold, rocky, wooded headland, from whence rises the highest part of the peninsula. At the foot of the cliff, and only a few yards distant, is a small, isolated rock, with perpendicular sides, crowned with bushes, called the Mogote de Brujas, which, when seen open of the bluff, is remarkable. The rock is connected to the bluff by a flat ledge, dry at low water, extending outside it about 200 yards; it is steep-to. There are 6 fathoms 400 yards from the rock.

“From Brujas Point to Toro Point, the west entrance point of Limon Bay, the coast trends about east-northeast 2 miles. The shore in this space forms a low shelf of rock, intersected near the middle by a small sandy bay, and is skirted at a short distance by a ledge nearly dry at low water.

“TORO POINT, the highest point of the peninsula between Chagres Bay and Colon Bay, is about $2\frac{1}{2}$ miles broad and 400 feet high. The summit is thickly covered with wood, and is consequently totally different in appearance from the low mangrove coast to the eastward, and this serves to point out the locality from a wide offing. From Toro Point a shallow coral ledge projects north-northeastward three-fourths mile, and is generally marked by heavy breakers. It should be given a wide berth. The ledge also extends one-half mile east-northeastward from the point.

“LIGHT—TORO POINT LIGHT.—On Toro Point, from an iron

tower painted red and white, on stone base, is shown a white light, which shows a flash of five seconds every thirty seconds. The light is elevated 108 feet and is visible 16 miles. The glare of the light has been seen 21 miles. When close to the light, the eclipses are not total.

“COLON, LIMON OR NAVY BAY.—Toro Point is $2\frac{1}{2}$ miles N. 79° W. (N. 84° W. mag.) of the Colon light-house, and between them is the entrance of Colon Bay. This bay is $3\frac{1}{2}$ miles deep from north to south and about 3 miles wide at the head. The depths at the entrance are $5\frac{1}{2}$ and $6\frac{1}{2}$ fathoms, whence they decrease to $4\frac{1}{2}$ fathoms in the middle and 3 fathoms at a mile from the head of the bay, and within this distance they shoal gradually to the beach to the southward. It would appear that the depths in this bay are continually decreasing.

“There are from 26 to 28 feet alongside of the wharves.

“In the season of the north winds, the bay being completely exposed in this direction, a heavy swell rolls in.

“Limon Point, on the west side of the inner part of the bay, stretches a little to the eastward, and affords shelter under its south side in Limon Harbor for small vessels in $2\frac{1}{2}$ fathoms of water.

“MANZANILLO ISLAND, which is about a mile long north and south and three-fourths mile broad, is very low, and for the most part covered by mangrove brushes. It is separated from the main by the Boca Chica, a narrow boat channel leading into the harbor. Its eastern portion is known as the Boca Grande. A coral reef skirts the north and north-west ends of the island to the distance of 200 yards. Reefs extend also off the entrance points to the Boca Chica, from 200 to 400 yards. A bridge of the Panama Railroad Company connects the island to the main.

“LIGHT—COLON LIGHT.—On Manzanillo Point, the north-western extremity of Manzanillo Island, a fixed white light is exhibited on the top of an open framework at an elevation of 60 feet, and should be visible in favorable weather at a distance of 10 miles. It is often difficult to distinguish this light from the ordinary white light carried by steamers.

“BUOYS.—A buoy has recently been moored by the Panama Railroad Company in $5\frac{3}{4}$ fathoms, Colon light-house bearing N. 60° W. (N. 65° W. mag.), distant one-sixth mile, and Toro light-house bearing N. 88° W. (S. 87° W. mag.), distant

$2\frac{1}{8}$ miles. Vessels should not pass between this buoy and the reef. Several buoys are also placed off the wharves for the convenience of wharfing or mooring. These, together with the Panama Canal buoys, are the only buoys in the harbor.

“DIRECTIONS.—There are no known dangers in the approach to Colon Bay other than the reef extending from Toro Point. The chart shows a $4\frac{3}{4}$ -fathom spot, position doubtful, about three-fourths mile N. 28° E. (N. 23° E. mag.) of Manzanillo Point light.

“ANCHORAGE.—The best anchorage in ordinary weather is abreast the Pacific Mail Company's dock, about 600 yards off, but in bad weather it is better to anchor on the opposite side to avoid the heavy sea that rolls in around Toro Point. The holding ground is good, but there are many anchors and cables strewn about the bottom.

“TIDES.—There is a rise of tide about 18 inches to 2 feet in Limon Bay, according to the winds, but the time is uncertain.

“NORTHERS.—These winds occur in November, December, and January. They are seldom violent, but a heavy sea rolls in.

“At Colon a norther is not necessarily a gale of wind; in fact, the wind frequently does not blow home, and is at times quite light, but very heavy ground swell heaves into the bay. When the wind does blow home, as happened during the norther of December 19–21, 1890, no vessel can remain at anchor with safety. There is no way of predicting these dangerous northers. The barometer gives no indication. The ‘fitful showers of rain in large drops’ may or may not be an indication. The gradually increasing swell, supposed to be a forerunner of a norther, frequently proves to mean nothing.

“The norther of December 19–21, 1890, was preceded on the 18th by a heavy swell and threatening weather, but toward evening the swell decreased, the weather cleared, and it looked like a fine night. Later in the night the swell commenced to heave in with greater force, so that steamers were compelled to leave their wharves. It was not till after daylight on the 19th that the full force of the norther began to be felt, and in a very short time it became so rough that all steamers put to sea. The Pacific Mail steamer *Newport* cut her lines and steamed across the bay to the anchorage under the lee of Toro Point, but was soon compelled to abandon this anchorage and put to sea. One steamer, lying in the

harbor with two anchors down, dragged nearly 1 mile before she could get sufficient steam to be able to slip and go to sea.

"During the season of northerly steamers should keep steam up constantly and be ready to move at a moment's notice. This is the custom of steamers of all nations which touch at this port, regardless of the time they may remain. However long the weather may have been threatening, when the northerly does break it comes suddenly and leaves no time for preparations. If compelled to get under way the surest way is to slip the chain and steam out to sea. It would be almost impossible to get up anchor without damage to the ship at such times, and there is always a risk of hooking one of the old anchors and chains with which the bottom of the harbor is strewn.

"COLON (ASPINWALL), on the west side of Manzanillo Island, is connected with Panama, $47\frac{1}{2}$ miles distant, by rail. It is almost entirely a port for a few lines of regular steamers running on through arrangements with the Panama Railroad Company, carrying cargoes destined principally for transit to and from the Pacific. The town stands on a low island which was originally covered with morass and jungle; there is no drainage possible of any value, and the malarial exhalations of the surrounding swamps, coupled with the emanations of the town, produce a condition of things most undesirable. There was a floating population of about 3,000 in 1901, composed principally of employees of the Panama Railroad Company, whose headquarters are at Colon. On account of better sanitary conditions the health of Colon is said to be somewhat improved of late.

"The United States is represented by a consul and vice-consul. The port is free.

"COLON APPROACH—SHOAL NORTHWARD OF MANZANILLO POINT.—Lieut. Commander W. R. Rush, of the U. S. S. *Marietta*, reports under date of March 11, 1902, having located a dangerous shoal about a mile northward from Manzanillo Point, east side of entrance to Colon Harbor.

"The *Marietta* anchored on the shoal in $4\frac{1}{2}$ fathoms and used two boats in sounding out the hummock in radial lines from the bow of the ship, crossing with parallels.

"The least water found was 23 feet, in one spot. From this depth of 23 feet the water rapidly deepened on all sides to 7 fathoms.

"The 23-foot spot is on the following bearings: Manzanillo Point S. 10° E. true (S. by E. $\frac{1}{4}$ E. mag.) Toro Point light-house S. 77° W. true (WSW. $\frac{1}{2}$ W. mag.). (Variation 4° E. in 1902.)

"Lieut. Commander W. V. Bronaugh, of the U. S. F. S. *Kearsarge*, reports under date of March 11, 1902, that the $4\frac{3}{4}$ -fathom shoal shown on Hydrographic Office chart No. 1008, about two-thirds of a mile N. 15° E. true (N. by E. mag.) from Manzanillo Point light-house and marked 'P. D.,' does not exist in its assigned position. Soundings taken March 11 over the assigned position of the shoal showed a least depth of 35 feet in the vicinity.

"COLOMBIA—COLON—BUOY OFF MANZANILLO POINT.—Lieut. Walter McLean, of the U. S. S. *Machias*, reports under date of May 15, 1902, that there is but one buoy off Manzanillo Point, entrance to Colon Harbor. This buoy is a large can buoy with spindle and vane painted a drab color. It is on the following bearings: Toro Point light-house N. 78° W. true (W. $\frac{5}{8}$ N. mag.). Statue on Christobal Colon Point S. $15^{\circ} 30'$ E. true (S. by E. $\frac{3}{4}$ E. mag.). Manzanillo Point light-house N. 85° E. true (E. $\frac{1}{8}$ N. mag.).

"COLON — PANAMA CANAL ENTRANCE — SOUNDINGS — BUOY.—Lieut. Commander A. E. Culver, U. S. Navy, commanding the U. S. S. *Bancroft*, reports under date of March 8, 1903, that he took soundings at the entrance to the Panama Canal to ascertain if it were practicable to take the *Bancroft* into the entrance of the canal during the season of northers. He found the soundings just about 1 fathom less than corresponding soundings shown on Hydrographic Office chart No. 1008.

"Of the buoys shown on this chart marking the entrance to the canal only one now remains, viz, the first black buoy bearing S. 57° E. true (SE. by E. $\frac{1}{2}$ E. mag.) from the statue on De Lesseps Point.

"SUPPLIES.—Fresh meats, vegetables, and fruit are scarce and of poor quality. Preserved provisions can be had in limited quantities.

"WATER can be obtained from the Panama Railroad Company at $1\frac{1}{2}$ cents gold per gallon, delivered in tanks on the wharf; it is taken from the river and must be thoroughly filtered before being used.

"COAL.—American and English coal can be had from the

railroad company alongside the wharf. The price is high. Coal may also sometimes be obtained from a vessel in the harbor at a much less cost.

“CHARGES.—Vessels entering the harbor are charged light fees, 5 cents per ton for first 100 tons, $12\frac{1}{2}$ cents for every additional ton, and in coming to wharf, wharfage in proportion to tonnage, as per printed rates of the Panama Railroad Company. Tonnage dues, \$1 per ton. Ships landing cargoes at Colon for the Isthmus of Panama must present to the inspector of the port a general manifest of all cargoes to be landed, also a copy of every invoice with the certificate of the Colombian consul at the port of shipment. This does not apply to cargoes in transit.

“PILOTAGE.—Not compulsory, from \$15 to \$30 (all charges payable in Colombian currency).

REPAIRS.—The railroad company's machine shops offer facilities for repairs.

“COMMUNICATION.—There is regular steam communication with various ports in the United States and Europe, as well as with Central and South American ports. Vessels of the Pacific Mail Company ply between Aspinwall and New York three times a month each way. There is telegraphic communication with the United States via Jamaica, and also via Panama and Vera Cruz.

“WHARFAGE.—The wharfage is ample, and large steamers find sufficient water (26 to 28 feet) to go alongside the wharves to embark and discharge. There is a boat landing at the northern wharf only.

“CLIMATE.—The Panama Canal district is one of the hottest, wettest, and most feverish regions in existence. Intermittent and malignant fevers are prevalent, and there is an epidemic of yellow fever at times. The death rate under normal conditions is large.

“RAINY SEASON.—The rainy season is from the end of April to the end of December, and almost incessant from June to the latter month. In 1889 the rainfall amounted to 119 inches, the greater portion of which fell during a period of four months.

“PANAMA CANAL.—The proposed enlarged port of Colon, northern entrance to the intended Panama Canal, was begun on the south shore of the Boca Chica, and the northern point of entrance to Boca Chica, named Terre-plein, was reclaimed

for the purpose of erecting workshops and stores and to cover the entrance of the intended canal. The canal, 46 miles in length, was begun in sections in 1882 and continued for several years. In March, 1889, the original Panama Canal Company was forced to go into liquidation for lack of funds and to suspend payment and all operations on the canal. In 1894 a new company was formed, which obtained a concession for ten years, extended in 1900 for six years, so as to terminate in 1910. By that time, according to the annual report of 1899, the canal could be completed at a cost of about \$100,000,000.

“MANZANILLO BAY.—Between Manzanillo Island and the main a small harbor is formed, which has a depth of from 4 to 2 fathoms. At the entrance, which is three-fourths mile wide, there is an anchorage in 5 fathoms, sand and clay, about one-fourth mile from the eastern shore, with the west end of Margarita Cay just open to the westward of Coco Solo Point, bearing N. 6° W. (N. 11° W. mag.).

“THE COAST.—Longarremos Point is formed of low mangroves and bordered with reefs to a distance of somewhat more than 200 yards, having 11 fathoms of water close-to. About 5 miles east-northeast of the point are the Naranjos Cays, covered with trees and surrounded by reefs. To the westward of them is anchorage in 4 to 7 fathoms, mud.

“Between the point and cays the mangrove shore is very irregular, and forms two bights or creeks, named ‘Minas;’ the eastern extends inward to the south-southeast about 3 miles, but varies in breadth; the western runs into the southward about a mile, and is much narrower than the other, and the shore of both are fringed with coral.

“These cays are near the entrance to the Grande River, and from here the coast trends about northeast by east 5 miles to Gorda Point, the land gradually diminishing in height from the point to the river, and westward of the river is very low and bounded by mangroves. From the point the coast trends to the northeast to Buenaventura Cove about one-half mile to the southward of Cocal Point. The cove is so obstructed by reefs as to be of little use.

“PORTOBELO (Porto Bello) is one of the best harbors west of Cartagena. The port being, however, inclosed to the north and south by hills ranging from 600 to 1,300 feet high, shutting out the regular breezes, and bounded on the east by dense swamps, the position is exceedingly unhealthy, and the

port is now of little commercial importance. The forts and government buildings have fallen into decay. The population in 1882 numbered about 500.

"The north side of the port is formed by a narrow irregular island, nearly $1\frac{1}{2}$ miles in length from east to west, of moderate elevation, and steep-to. The south shore is bounded by the base of the mountains, which rise, not far inland, to a height of 1,300 feet, and are seldom unclouded. This side is foul, being skirted by a coral reef to the distance of 200 to 400 yards, with irregular soundings some distance outside; the depth of the water in the harbor is reported to be decreasing considerably.

"The village of Portobelo and the ruins of the Castle of St. Jeronimo are situated on the beach, in the southeast corner of Portobelo. There is a sand bank of 6 feet water extending in a northerly and westerly direction from the castle. On the north shore, opposite the town, are the ruins of San Fernando Castle, hidden by bushes.

"Off Cocal Point, the southwest point of the port, are three small islets, the outermost and largest named 'San Buenaventura,' lying 600 yards southwestward of the point. Foul ground extends about 600 yards to the westward and northward of these islets; and at this distance, with the northwest point of the outer islet bearing south (S. 5° E. mag.), and Cocal Point S. 55° E. (S. 60° E. mag.), is the Farnesio Shoal, of 4 fathoms, within which there is no safe passage.

"At the head of the port a sand bank stretches off about 500 yards from the mangroves, leaving a channel on the north side into the careening cove, which has depths of 3 or 4 fathoms.

"Between Portobelo Point and San Buenaventura Islet the width of the entrance is $1\frac{1}{4}$ miles; but a short distance within this, between Iron Castle Point and the south shore, it is about one-half mile wide; this breadth is carried up for about a mile, to the head of the harbor, and the depth gradually decreases from 17 to 7 fathoms, close up to the edge of the sand bank.

GREEN ISLET.—At 300 yards southwestward of Portobelo Point is Green Islet, little more than 100 yards in extent from east to west, and having a break in the middle which appears at a certain distance to divide it into two parts. It is clear all

around, but the passage between it and the point is not safe for large vessels.

SALMEDINA BANK.—At one-fourth mile west of Green Islet is the Salmedina Bank, on which the sea breaks in two distinct patches. It is composed of rock, about 100 yards in extent, dry at low water, with 6 fathoms close around; in the channel between it and the islet there are 16 to 21 fathoms, clay. The bank has been reported as lying N. 79° W. (N. 84° W. mag.), three-fourths mile from the position assigned.

"DIRECTIONS FOR PORTOBELLO.—The wind generally blows out of Portobello, or is light and baffling, according to the seasons; a vessel will therefore most probably have to work or tow in. In approaching from the northward it is advisable to leave the Duarte Islets about one-half mile to the eastward, thence avoiding the position of the rock charted off Mantilla Point, steer to pass about 200 yards, or with a steady breeze even less, from Green Islet, to avoid the Salmedina.

"Having passed the islet, the vessel may keep close to the wind, with the north shore aboard, and in the season of the breezes she will fetch into the middle of the harbor. After passing Iron Castle Point, in working up, when standing to the southward, no part of the town must be shut in with the land to the westward, to avoid the ledge off the south shore. An anchorage may be taken up as most convenient, for with the exception of the above ledge, there is no known danger.

"When approaching from the westward it is recommended to keep the shore about 3 miles distant; and in the night the soundings should not be neglected, as between Chagres and this port they extend from 8 to 10 miles. From this direction the entrance is made known by two remarkable trees on the top of the hill on the south side and a signal post upon a hill on the north side of the harbor; the continued existence of either, however, is very doubtful, but from this quarter the opening itself is sufficiently remarkable. In standing toward the San Buenventura Islands Green Island must not be opened to the westward of Portobello Point or brought to bear to the northward of N. 28° E. (N. 23° E. mag.), and in standing toward the Farnesio Shoal from the northward the northernmost extremity of the lines of St. Jeronimo castle must be kept well open of the land.

“From May to November light breezes from the southwest and west with heavy rain prevail in the harbor, but toward morning there is a light air from the northeast; therefore, in leaving, vessels should be prepared to get under way at day-break, with boats ahead to tow.

“It is also to be observed that the northeasterly current runs strong close to the entrance of Portobelo, and in the rainy season at least $1\frac{1}{2}$ knots an hour as far as Farallon Sucio. Sailing vessels, therefore, should make the port from the westward, more particularly during the months of August to November.

“PORTOBELLO (PORTO BELLO) POINT, the northwest point of the entrance of Portobelo, bears S. 20° W. (S. 15° W. mag.) $2\frac{1}{4}$ miles from the northernmost part of the Duarte Islets. The coast is high and scarped, and close westward of Mantilla Harbor is a small harbor called Leon, of not much importance, the entrance being almost blocked up by reefs and a small island at the mouth.

“ROCK.—Midway between the Duarte Islands and Portobelo Point and 700 yards offshore there is a rock which always breaks. José Pobre Point is just open off Sabanilla Point N. 56° E. (N. 51° E. mag.) when near it.

“SABANILLA POINT is fringed by a reef and some rocks, the adjacent coast is high and scarped with some bays, and José Pobre Point, N. 61° E. (N. 56° E. mag.), $1\frac{1}{2}$ miles from Sabanilla Point, projects a short distance.

“DUARTE ISLETS are four in number, extending north-northwest and south-southeast three-fourths of a mile. From the northernmost islet a reef extends in a northwesterly direction about 200 yards. The southernmost islet is separated from Duarte Point on the main by a channel a little more than 400 yards wide, and from Sabanilla Point by a channel a little more than one-third of a mile across; between these two channels there are from $2\frac{3}{4}$ fathoms water close to the islet to 15 fathoms toward the main. The southeast side of the island is fringed by a reef to the distance of 100 yards or more.

“FARALLON SUCIO is the name given to the westernmost of a cluster of five small rugged rocks, which occupy a space of about one-fourth of a mile from east to west. It appears to be steep-to, but from the easternmost rock a foul ledge

extends 300 yards to the southeast. The northernmost islet lies west nearly 4 miles from Tambor Island, with 16 to 30 fathoms clay and sand between, and 16, 21, 22, and 25 fathoms between the north islet, the islets off the coast, and Lavadera Shoal. These rocks appear from a distance as one islet, which is remarkable for its barren whiteness. This contrast with the Duarte Islets, which are dark, or the mainland, makes them an excellent landmark from all directions.

“BOQUERONES POINT is high, salient, and scarped. About a mile to the southward Casique Hill rises to a peak of moderate height. Northeastward of the point there are five small islets named the Boquerones, about 600 yards in extent, which are the westernmost of the reefs and cays that extend from Pelado Islet.

“GARROTE HARBOR.—At $2\frac{1}{3}$ miles southwestward of the highest part of Tambor Island is the entrance of Garrote Harbor, which is formed on the south side by the mainland, on the east by Great Garrote Island, and on the west by Pelado and other islets, which extend westward for about $1\frac{1}{2}$ miles to the mouth of the Boquerones. The entrance, which is scarcely 600 yards wide between the reefs westward of Great Garrote Island and Pelado Islets, runs in a southerly and southeasterly direction, with depths from 12 to 18 fathoms, mud, decreasing to $6\frac{1}{2}$ fathoms within.

“BASTIMENTOS HARBOR, although with depths of $3\frac{1}{2}$ to 7 fathoms and sheltered, is of little importance. All its shores are bounded by reefs, and the customary anchorage is to the southwest, south, and southeast of the south or sandy point of Bastimentos Island.

“BASTIMENTOS ISLAND is nearly a mile in length northeast and southwest, and forms, with the mainland, the northeast channel of Bastimentos Harbor, which is about 300 yards wide between the reefs, with 5 and $5\frac{1}{2}$ fathoms, sand. The island is foul on its southeast, south, and southwest sides; the latter, with Cabret Island, which bears a little to the south of west, forms the northwest channel, 600 yards wide in the narrowest part between the reefs, and carries from $3\frac{1}{2}$ to 9 fathoms, mud.

“LAVADERA SHOAL, northward, nearly three-fourths of a mile from the northern extremity of Pelado Islet and west 1 mile of Cabret Islet, at the mouth of Bastimentos Harbor, is composed of rock with very little water on it, and steep-to.

There are 7 and 9 fathoms close to a rock, on which the sea breaks. The channels between it and Cabret and Pelado islets carry from 14 to 17 fathoms on mud.

“MOUNTAINS.—Between Garrote and Bastimentos harbors is the hill of Garrote, tolerably high, its summit terminating in a peak, about three-fourths of a mile from the coast. At $3\frac{1}{2}$ miles about south by east of the little bay of Garrote is the high mountain of Capira, almost always covered with clouds. It is nearly east from Porto Bello.

“At a short distance to the southward of Capira are the Sierras Lloronas, extending nearly east and west. The eastern part of its summit appears as if cut down vertically, forming a peak, named Campana, or the Bell, and from this peak the ridge descends gradually to the westward to near the peak of Guanche. The Llorona is the highest range on this part of the main, its summit reaching an elevation of 3,000 feet, and its appearance is such that it can not be mistaken for any other. In clear weather it may be seen from a distance of 45 miles, but in the season of fresh breezes it is generally covered with haze. In the season of the vendavales and variable winds it is often visible between 8 and 9 in the morning and 4 and 5 in the afternoon, but in the remainder of the day it is covered with clouds.

“TAMBOR ISLAND, about $1\frac{1}{2}$ miles westward from Manzanillo Point, is high, round, and scarped, and connected by a reef 400 yards long, with the northernmost part of Venados or Bastimentos Island.

“MANZANILLO POINT, the northern extremity of the coast of Panama, is a high scarped projection, with two hummocks on it resembling a saddle. Near this point are several islets and a shoal. Martin Pescador, the outermost islet, is about 200 yards in extent from north to south, and lies about a mile eastward of the point. About 800 yards S. 28° W. (S. 23° W. mag.) of this islet and about three-fourths of a mile from the point is Manzanillo Island, which is the largest. Off the north side of this island are three rocky islets, the farthest out being distant over 200 yards. S. 28° W. (S. 23° W. mag.) of the same island there are three more small islets, surrounded by reefs extending northeast and southwest, and also to the eastward, about 300 yards, there is another small one. All these islets are high and scarped. Between those of Manzanillo and Martin Pescador there are from 10 to 14 fathoms water.

“MANZANILLO SHOAL, lying northwestward, distant 800 yards from Manzanillo Point, has very little water over it and 5 and 6 fathoms close-to. Between it and the point the depth is 13 fathoms.

“With Manzanillo Point bearing S. 51° W. (S. 46° W. mag.) and Tambor Island west (S. 85° W. mag.) about 4 miles distant, 6 fathoms water, over rocky bottom, have been obtained, deepening to 20 fathoms in a northwest direction.

“LIGHT—ISLA GRANDE LIGHT.—On Isla Grande, off Manzanillo Point, from a white tower is shown a light flashing white and red, alternately, every five seconds. The light is elevated 305 feet and visible 24 miles. The light has been observed to be very irregular in its action, sometimes obscured and sometimes showing white or red only for some minutes' duration.

“SAN CRISTOVAL BAY.—At 5 miles S. 79° E. (S. 84° E. mag.) of Manzanillo Point, a mile to the eastward of which is the islet of Martin Pescador, is Pescador Point; both are high and scarped. Between these points the shore recedes to the southward, forming a bight about 3 miles deep. At $3\frac{2}{3}$ miles westward of Pescador Point the shore projects considerably at Cristoval Point, and to the southwestward of this, at the bottom of the bight, is the small foul bay of San Cristoval. About 400 yards northeastward of Cristoval Point is an islet named Juan del Pozo, surrounded by rocks, and about southeast one-half mile from the islet is the Vibora Bank. Between this bank and Juan del Pozo, and between the latter and the point, there are 9, 10, and 13 fathoms water on gravel and coarse sand, and between the Vibora and Buey shoals, off Pescador Point, there are about the same depths on sand and clay.

“From the head of San Cristoval Bay reefs extend nearly a mile toward Cristoval Point. This part is dangerous in strong winds. The coast between Cristoval and Manzanillo points is lofty and scarped.

“NOMBRE DE DIOS HARBOR.—At the east side of San Cristoval Bay, about $1\frac{1}{2}$ miles southwestward of Pescador Point, is the small cove or harbor of Nombre de Dios. Its mouth has $3\frac{1}{4}$, 4, and 5 fathoms, but the entrance points are skirted by reefs, and so is the greater part of the interior.

“CAUTION.—From the numerous shoals which have been pointed out it will be quite evident to the mariner that to

navigate within this bight requires the greatest care and attention, and the leeward part of it should be avoided altogether.

“PESCADOR OR TERRIN POINT is fringed with reefs which extend northward 200 yards and westward one-half mile, and, continuing on in a southerly direction, surround three islets lying between the point and the northeast point of Nombre de Dios Harbor. At 400 yards northwestward of Pescador Point is Pescador Islet, and N. 62° W. (N. 67° W. mag.), about a mile from the same point, is the Buey Shoal, between which and the reefs skirting Pescador Point there are 9 and 12 fathoms.

“MOUNTAINS.—Among the mountains in this neighborhood two are remarkable, named Saxino and Nombre de Dios. The first is high and terminates in two peaks near each other, the northeasternmost of which bears about S. 6° E. (S. 11° E. mag.) 7 miles from Pescador Point. The latter mountain rises to a single peak, about south by west 8 miles from the same point, and is a guide for Nombre de Dios Harbor, which is nearly on its meridian.

“ISLANDS.—At 8 miles to the eastward of Pescador Point is Quengo Island, about one-half mile from shore, and 6 miles farther eastward is the small islet of Culebra.

“MOUNTAINS.—The mountains along this coast are sufficiently remarkable and useful objects. The Cerro de la Gran Loma or Gordo, rising southwestward 7 miles from Culebra Islet, being rather more prominent than others in this neighborhood, serves as a mark for keeping clear of the Escribanos bank and shoals. The summit of this hill is of some extent, and appears a little higher than the Cordillera, in which it is situated.

“ESCRIBANOS HARBOR.—Cocos Point is on the east side of the mouth of Escribanos Harbor. Thence the shore to Perro Cay is low and forms something of a bay, skirted by a reef. The most prominent objects on it are Playa Colorado, which is round and skirted by reefs extending off 200 yards; Mogote Point, which is small, a little salient, and has a hillock on it; and Morro Colorado, also round, scarped, and projecting but little.

“Cocos Point projects into the sea, and from it Escribanos Point bears W. 6° S. (W. 11° S. mag.) $1\frac{3}{4}$ miles. In the middle of a bay formed between these points is Escribanos Harbor,

extending to the southward one-half mile, and having only from 6 to 9 feet water in it. Outside, off both points, there are very shallow reefs, and in the channel formed by them there are from $3\frac{1}{4}$ to 6 fathoms.

“ESCRIBANOS SHOALS.—About 2 miles northeastward of Escribanos Point there are two rocky shoals lying close together, with very little water over them. The one nearest the coast extends east-northeast and west-southwest about a mile, and has a small islet upon it; the other lies about west-northwest from the islet, and is nearly a mile in extent from east to west; both are steep-to, with 3 and 4 fathoms on them.

“ESCRIBANOS BANK.—At $5\frac{1}{2}$ miles N. 51° W. (N. 56° W. mag.) of the Escribanos Shoals is the bank of the same name, which extends nearly 2 miles in that direction, and has from 6 to 8 fathoms water over rocky bottom. There is possibly less water. To the northward of this edge 400 yards are 16 to 31 fathoms, and its northwest end bears N. 34° W. (N. 39° W. mag.) 8 miles from Escribanos Point. Heavy seas generally break upon it, but otherwise a good lookout must be kept from aloft for the discolored water.

“The channel between this bank and the Escribanos Shoals carries from 8 to 17 fathoms water on sand, gravel, and rocks.

“CORAL SHOAL.—In 1879 the captain of the mail steamer *Saint Laurent* reported that his vessel touched twice 10 miles from the coast, between San Blas and Manzanillo points. Cape Manzanillo bore S. 79° W. (S. 74° W. mag.), and the vessel had passed 3 miles to the northward of Escribanos Bank.

“The captain thought the vessel struck upon a bank of coral. When she struck the second time the following bearings were taken: Quengo Island S. 6° E. (S. 11° E. mag.), and Tambor Island S. 70° W. (S. 65° W. mag.). No surroundings were taken. Vessels should pass well to the northward of this doubtful ground.

“PIEDRAS AND PERRO CAYS.—Off the northern part of San Blas Point, which is low and covered with mangroves, lie the Piedras and Perro cays, united to the Cay Frances Reef, which terminate at an island in front of a lagoon $1\frac{1}{4}$ miles farther to the westward.

“GULF OF SAN BLAS.—San Blas Point, which forms the north point of the gulf of that name, is low and skirted by a reef to the distance of $1\frac{3}{4}$ miles, on which are several cays;

the easternmost is named 'Cay Frances.' From San Blas Point to Mandinga Point, south of it, the gulf is 6 miles wide, and to the westward of that line it is about the same distance deep; the coast is low all round and bounded by mangroves. In a southwesterly and westerly direction from Cay Frances there are 12 or more islets, upon some of which are small fishing establishments, and to the eastward of them are many banks and islands, forming part of the Mulatas Archipelago, with various channels between.

The bottom is foul for $1\frac{1}{2}$ miles northeastward of Cay Frances, at which distance the depth is 4 fathoms on the edge of the reef, whence it drops into deep water.

"SAN BLAS CHANNEL, the westernmost into the gulf, lies between the San Blas Cays to the westward and the Chichime and Lemon cays to the eastward and southeastward, and is $1\frac{3}{4}$ miles wide, with depths in the fairway of 11 to 25 fathoms.

"CHICHIME CHANNEL lies close eastward of Lemon Cays, and is about one-half mile wide with a depth of 12 fathoms. Patches of 5 fathoms lie $1\frac{1}{4}$ and 2 miles northwestward of Chichime Cays.

"HOLANDES CHANNEL, the largest of all in this direction, is $2\frac{1}{4}$ miles in width, with depths of 13 to 30 fathoms on sandy bottom. Its entrance is formed on the east by the western extremity of the reef extending from the Holandes Cays, which break heavily, and on the southwest by Icaeos Cay, which is dry and covered with high icacos trees.

"At a little more than $1\frac{1}{2}$ miles to the west-northwest of Holandes Cays there is a rocky bank of 6 fathoms, one-half mile long north and south, which breaks when there is but little swell. It should be left to the westward in entering.

"DIRECTIONS.—To enter the Gulf of San Blas by the San Blas Channel, which is the best, having opened out the mouth of the channel and being on the meridian of the second islet (from the westward) of the Lemon Cays, steer south (S. 5° E. mag.) toward it until about abreast Cay Frances, the easternmost of the San Blas Cays. Thence the course will be about southwest, through the middle of the San Blas Channel, between the reefs which extend from Cay Frances and those from Gallo Cay, the westernmost of the Lemon Cays. Being within the latter, a vessel may proceed as most convenient to an anchorage on the north side of the gulf, or to Inglesa Bay, in the southwest part of it, or to that in Mandinga Bay, which is well sheltered.

“Should the Holandes Channel be taken, the eastern side is well marked by the edges of the reefs extending from the westernmost of the Holandes Cays, and, as already said, a vessel should pass between them and the 6-fathom bank, on which the sea generally breaks, situated N. 62° W. (N. 67° W. mag.) 1½ miles from them. Then steer for the east end of the Icacos Reef, giving it a good berth in passing; and having brought Icacos Cay to bear N. 5° E. (North mag.) shape course to pass southward of Guard Cay to Mandinga Bay. The channel is clear of danger, with depths from 21 to 25 fathoms, oozy bottom, and from 2½ to 3 miles wide, between groups of rocks, detached cays, and reefs.

“CAUTION.—Little is known of the northwest or southwest heads of the gulf, and great caution should be exercised when navigating here; the eye, aloft, is the best guide.

“TRADE.—The district of San Blas has not been open to civilization or settlement, as the Indians inhabiting its coast and mountains are openly hostile to Colombian rule; it is therefore but little known. Vessels trading along this coast are obliged to call at Cartagena, where duties are levied and collected on their cargoes.

“MULATAS ARCHIPELAGO.—Off San Blas Point commences the extensive archipelago of the Mulatas, composed of cays, shoals, and reefs, which, sweeping round to the southeastward at a considerable distance from the mainland, terminate at Pajaros Island, about 80 miles distant. Pajaros Island lies about 2 miles northward of Pinos Isle. It is low, covered with brushwood, and surrounded by reefs having 7 and 8 fathoms close-to.

“The cays are mostly low, flat, sandy, and thickly wooded, and lying in clusters, having navigable channels between, leading into secure anchorages within them all along the shore. Some of the cays have springs of good water, and convenient spots for landing and careening, and the fishing and turtling around them is excellent.

“The main shore contains several sandy bays, with many small streams running into them, but from the fringe reef are extremely difficult of access.

“The interior of the main is high and mountainous, and there are many remarkable peaks, which serve as guides to the anchorages and channels to those with local knowledge.

“The principal channels are those of San Blas, Chichime,

Holandes, Caobos, Moron, Mangles, Puyadas, Arebalo, Playon Grande, Ratones,*Rio de Monos, Cocos, Punta Brava, Zambogandi, Cuiti, Mosquitos, and Pinos, which are all more or less easily navigated by those acquainted with them. Great care and attention to the lead is required in navigating this coast, for it is supposed many banks lie outside the cays similar to those in the neighborhood of the Sasardi Islands, which in heavy weather are dangerous.

“**HOLANDES CAYS.**—This group is about 7 miles in extent east to west. Its eastern extremity lies N. 84° E. (N. 79° E. mag.), 18 miles from San Blas Point. The north side of the reef which bounds the cays is 8 to 10 miles from the coast, and the cays are separated from those immediately adjacent to the mainland by a clear opening 3 miles wide. A patch of 5 fathoms lies about 2 miles S. 11° E. (S. 16° E. mag.) of Caobos, the largest of the Holandes Cays. It is apparently the best channel to the anchorages in the Gulf of San Blas when coming from the eastward, but sailing vessels would have to leave by one of the northern channels. Many spots on the chart have not been sounded.

“**NAVAGANDI OR MONA RIVER.**—At 3 or 4 miles to the westward of Pinos Isle is the entrance to this little river. The water in it is excellent, but the narrow cuts leading in through the reefs are intricate and the breakers so heavy that it is extremely difficult and dangerous for a boat to get through them. Abreast the west end of Pinos Isle is the entrance of the Navagandi lagoon, which is blocked up by the reefs which skirt the shore all along.

“On a sandy spit on the east side there are a few huts, and 6 or 7 miles up the river there is a settlement where vegetables and poultry may be obtained.

“**PINOS ISLE**, the southeastern extremity of which lies northwestward, about 2 miles from Sasardi Point, is about a mile in length southeast and northwest, and a little less in breadth; it is separated from the main by a channel 400 yards wide in its narrowest part, with 2 to 3 fathoms water on sand and grass. The island is 400 feet high, and a hill extends through it, on which are two remarkable wooded peaks; its northeast and south sides are scarped and bordered by reefs, which, however, lie near the shore.

“**WATER.**—On the south side of Pinos Isle there is a small stream of good water, which runs down a gully and into a

small basin at the bottom of the declivity, but so near the shore that an unusual rise of the tide washes away the sand, and the sea flows into it.

"Firewood may be cut to the eastward of the watering place, but great care must be taken to avoid touching the manchineel tree, which abounds here and is poisonous.

"ANCHORAGE.—There is anchorage both off the east and west ends of Pinos Isle, but exposed, the former from the east to northeast, the latter from the north to northwest; and a constant ground swell rolls in, particularly at the eastern anchorage, which makes riding very uneasy. At the east end a berth will be found in 9 fathoms, with the south end of the island about N. 18° W. (N. 23° W. mag.), but vessels of light draft may go so far in as to bring it to bear N. 28° E. (N. 23° E. mag.). The point is so bold that a small vessel might heave down alongside it.

"The western anchorage is by far the better, being partly sheltered from the sea breeze. These anchorages, however, should only be used in case of necessity.

"SASARDI BAY AND HARBOR.—The Sasardi Islands are separated from Sasardi Point on the main by an opening three-fourths of a mile wide, which is exposed on the northeast side. From Sasardi Point the coast trends to the northward, then to the southwestward, forming a bay about three-fourths of a mile in extent, near the center of which there is convenient anchorage for watering in 4 to 6 fathoms. The Sasardi Rivulet, about 10 feet wide and with 2 feet of water on the bar, flows into the western side of this bay and is the best place to obtain water; canoes manage to get up it with some difficulty about 2 miles; on the north side of the entrance there is a village. The land is here much lower than in the neighborhood of Port Escoces.

"In the interior of the bay there are several shoals nearly awash and consequently easily avoided; a small reef with $1\frac{1}{4}$ fathoms on it lies to the southward of Sasardi Point, distant about 800 yards, and just within the line of entrance about two-thirds the way across from Sasardi Point there is a hard flat ledge about 400 yards in length, upon which the sea generally breaks. The channel to the eastward of this ledge is only 400 yards wide, with a depth of 4 fathoms; to the westward of the ledge in mid-channel there are 9 fathoms. The outermost of the banks in the immediate vicinity of the

entrance has $3\frac{1}{2}$ fathoms over it and lies N. 42° E. (N. 37° E. mag.) 2 miles from the western extremity of the Sasardi islands, with the northeastern extremity of Oro Island just shut in with the Crag Rock, bearing S. 32° E. (S. 37° E. mag.). A bank of $4\frac{1}{2}$ fathoms lies N. 5° E. (north mag.) $1\frac{1}{2}$ miles from the $3\frac{1}{2}$ -fathom bank.

“SUPPLIES.—The inhabitants of the village of Sasardi subsist by fishing and hunting and the cultivation of plantains and cocoa. The latter article and cocoanut oil are exported in small quantities in American vessels, which give in exchange arms, ammunition, cotton, and culinary articles. No live stock is to be obtained, but the sea abounds in fish, and plenty of turtle are caught in May and June.

“The interior is densely wooded with trees of the most valuable description, growing to the height of 70 to 100 feet. Among them are found the mahogany, cedar, silk-cotton, ebony, satinwood, rosewood, fustic, logwood, with many of the pine family adapted for spars and masts. The Indians use cedar for their canoes and a red wood called calli-calli, which is very hard and durable, notwithstanding the destructive effects of the worms and insects of this climate.

“WATER.—The Sasardi Rivulet is by far the most convenient place at which to water.

“DIRECTIONS.—In approaching Sasardi Bay or Harbor from the eastward, the mark already given for the outer banks should not be crossed until the Sasardi village is brought just in sight to the southward of Sasardi Point, S. 87° W. (S. 82° W. mag.). This latter mark will lead to the southward of the outer bank, and when the west end of Sasardi Island bears S. 23° W. (S. 18° W. mag.) the course may be altered for either of the channels most convenient. If intending to enter the harbor between the cays and the main, and the eastern channel is taken, the reefs which skirt the Sasardi Islands should be rounded within 200 yards; if the western channel, the opening should be steered for about one-third the distance across the Sasardi Point.

“After passing the shoal in the middle, composed of hard limestone, Sasardi Island will be found steep-to, and anchorage may be taken up anywhere within 200 yards of it in from 5 to 7 fathoms. The shoals all lie on the western side of the harbor, and are easily avoided by the eye. To sail out is not so easy, except with a land wind, for the channels are narrow and the sea rough with the usual sea breeze.

"TIDES.—The tidal streams are overcome by a current which sets through the Sasardi Channel to the southeastward about one-third mile per hour.

"ORO ISLAND, the easternmost and highest of a range of cays and rocks which lie from 1 to 3 miles from the mainland and extend in a northwest direction about 5 miles, is 470 feet high at its eastern extremity. The edges of the reefs which skirt it and the little cays and rocks extending a mile to the southeastward of it to Piedra Isle always show themselves and are steep-to. The Oro Shoal of 4 fathoms, which lies 400 yards from the eastern point of that island, also breaks in strong breezes.

"CALEDONIA HARBOR.—Between these cays and the main are two well-sheltered harbors, the westernmost, Sasardi, the easternmost named Caledonia, which are only separated by a narrow bar with 12 feet water over it.

"The entrance to the harbor is one-half mile wide between the shoals fronting Oro Island and the Reventazones breakers, with a depth of 15 to 17 fathoms in the fairway and 8 to 9 fathoms in the anchorage. Apparently there is no settlement here.

"REVENTAZONES SHOALS.—The entrance to Caledonia Harbor is obstructed by three dangerous shoals, on which the sea breaks heavily in strong breezes, lying about a mile to the southeastward of the cays extending from the southwest end of Oro Island.

"The shallowest spots are known as Outer, Middle, and South shoals, with least known depths of $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, and cover a space of $1\frac{1}{4}$ miles north and south.

"A patch of $4\frac{1}{2}$ fathoms lies about a mile N. 72° E. (N. 67° E. mag.) of the south extreme of south shore, about midway between it and an outlying 4-fathom patch in the approach to Port Escoces.

"Mount Vernon, on the southeast point of entrance to the harbor, and Piedra Isle, the southeasternmost of the cays (which is very small) in line, bearing about S. 84° W. (S. 79° W. mag.), will lead just clear to the northward of the outermost shoal, which has $3\frac{1}{2}$ fathoms water. There are channels between the shoals and between the southernmost and the main, all of which are clearly pointed on the chart, but they are too intricate for a stranger to navigate.

"WINDS AND SEASONS.—In Caledonia Harbor, as elsewhere on this coast, there are two seasons, the wet and the

dry. The latter continues from January to April or May, when the wind blows strong and often violent during the day from north-northwest to north-northeast, accompanied by a very heavy sea, and lulls on the shore to nearly a calm during the night. At this season the temperature is about 82° , the atmosphere is exceedingly moist, and so hazy that at times the land can not be seen more than 5 miles, yet the climate is generally healthy.

"In the rainy season, which occupies the remaining portion of the year, the breeze lulls and becomes variable, and a land wind blows off, with occasional squalls from the southwest ward.

"TIDES.—It is high water, full and change, at Caledonia Harbor at 11h. 40m.; the rise at springs is $1\frac{1}{2}$ feet and at neaps 6 inches.

"DIRECTIONS.—Approaching Caledonia Harbor, and having brought Oro Island to bear about $S. 51^{\circ} W.$ ($S. 46^{\circ} W.$ mag.) before Carreto Peak comes over the outer isleta (the line of the outer banks), Piedra Isle must be brought in line with a remarkable hill, bearing $S. 45^{\circ} W.$ ($S. 40^{\circ} W.$ mag.), which mark will lead between the outer banks. The reefs which skirt Ora Island must then be rounded at the distance of 400 yards, passing between them and the Reventazones Banks. From abreast Rocky Cay a vessel will generally have to work to windward, and when standing to the westward the south end of the sandy beach in Surf Bay must not be shut in with San Fulgencio Point, at the base of Mount Vernon, nor must Rocky Cay be shut in with Dobbin Cay when standing to the eastward.

"These limits give a clear space of 8 to 10 fathoms water on mud, in any part of which there is good anchorage. If desirable to go farther up, as far as Scorpion Cay, the eye must be the guide, observing that the bottom can not be seen at a greater depth than 12 feet.

"An entrance can also be made as far to the southward as to bring on the mark given before for clearing the north end of the Reventazones, but great care must be taken not to open Mount Vernon to the southward of Piedra Isle before these banks are passed or the Oro Rock is in line with Craig Rock, the outermost islet.

"In sailing out of the harbor vessels will generally have a wind either from the north-northeast in the season of the

breezes or off the land occasionally in the wet months. It will be merely necessary to skirt Rocky Cay and reef at a safe distance and, getting on the line of Piedra Isle and Mount Vernon, proceed to sea on that mark. Should the wind not admit of this, short tacks must be made toward and along the reef until past the outer Reventazones Shoal. In the event of missing stays when standing close to the Reventazones Breakers, a thing very likely to occur from the heavy sea, it would be better to keep away and pass to the leeward of the shoal than attempt to tack again. Vessels can also pass out along the shore to the southward of the Reventazones, taking care not to go outside the line between the west extreme of Dobbin Cay and a remarkable solitary tree on Scorpion Cay, N. 40° W. (N. 45° W. mag.), until the Aglatomate huts bear northward of N. 85° W. (West mag.), or the outer isleta is just shut in with the northern extremity of Escoces Point, when the vessel may haul out to the eastward of those shoals.

“Tree Top Hill, 200 feet high, touching north side of Mangrove Cay or the north extreme of San Fulgencio Point, bearing N. 65° W. (N. 70° W. mag.), leads between Escoces Point and the off-lying banks.

“ESCOCES POINT terminates at Pattersons Hill, 260 feet high; but 3½ miles to the southward of it the mountain ridge, which extends parallel to the shore, rises to the height of 1,180 feet, and about 7 miles to the westward to the height of 1,985 feet. About 3 miles southeastward of the point and about a mile from the shore are three small rocky islets, named Las Isletas, and within them is a cay of larger dimensions.

“PORT ESCOCES.—Escoces Point is the extremity of a narrow neck of land about 2 miles in length in a northwest direction which forms the northeast side of an inlet of irregular breadth, named ‘Port Escoces.’ In the center of the outer part there is a depth of 6 fathoms, whence it gradually decreases to 3 fathoms at the head of the inner arm.

The entrance is about three-fourths of a mile wide, but the outer part is obstructed by the Escoces Reef, 3 feet high, lying about three-fourths of a mile to the westward of Escoces Point; there is a channel for either side of it, but the western is the better. The west and south sides of the reef are bold, but about 400 yards N. 67° E. (N. 62° E. mag.) of it there is a small head, with 18 feet water. With a strong northeast

wind the sea breaks across between the rock and Escoces Point; also on the Middle Reef, Antonio and Harbor Rocks, in the interior of the inlet.

“In the approach from the southward and eastward are several coral banks. One of them, with a least known depth of $4\frac{1}{2}$ fathoms, lies with the north extreme of Escoces Point S. 81° W. (S. 76° W. mag.), distant about 2 miles. A patch of 4 fathoms lies with the east extreme of the point South (S. 5° E. mag.), distant about $1\frac{3}{4}$ miles.

“Carreto Peak, in line or shut in on the outer islet, leads inside the $4\frac{1}{2}$ -fathom bank, and the peak kept open of that islet leads outside the 4-fathom bank.

“WATER.—Several small rivulets of good water run into the south side of the port, but they are sometimes dry, and landing is generally difficult. In a little sandy bay about 3 miles to the westward of Escoces Point, is the entrance of the Aglatomate River; and one-half mile farther on, in Surf Bay, is the entrance of the Aglaseniqua.

“These rivers are from 20 to 30 feet broad and never dry, and the waters in both are excellent, but difficult to obtain in rough weather. When moderate, the best landing is under cover of the little reef at the mouth of the Aglaseniqua; but the most convenient place for watering is at the mouth of the Sasardi, farther northward. On the west side of the entrance of the Aglatomate there are a few bamboo huts.

“DIRECTIONS.—Vessels of heavier draft than 20 feet must approach the entrance to Port Escoces with great care, for there are several coral banks in the offing which, in heavy weather, are dangerous. Having rounded the Escoces Reef within the distance of about 400 yards to the westward, the eye must be the guide, directing the course in mid-channel until nearly abreast the narrowest part of the entrance, between the old fort point and the opposite side, when the eastern shore should be kept aboard to avoid the Middle Reef, which may be seen from aloft.

“Anchorage may be obtained as soon as convenient within the Middle Reef. In entering the inner arm the wind baffles so much after passing Harbor Rock as to make it very dangerous, although there may be a strong breeze outside.

“PORT CARRETO.—On the west side of Carreto Point, between it and some small islets lying about $1\frac{1}{2}$ miles to the northwestward of it, the shore curves to the southwestward,

forming a bay about a mile deep, in which there are not less than 3 nor more than 8 fathoms water. Being exposed, however, to the heavy sea thrown in by the northeast breezes, it is only of use as an anchorage in the season of light weather.

“CARRETO SHOALS.—To the northward of this port about $1\frac{1}{2}$ miles are two small rocky banks, near each other, lying in a northeast and southwest direction, with $5\frac{1}{2}$ fathoms over them and 20 to 25 fathoms close around, but they break with fresh breezes.

“ANACHUCUNA BAY.—From the point under the peak of Carreto to Cape Tiburon the shore, consisting of a sandy beach, extends about east-southeast 13 miles, forming a bend about $2\frac{1}{2}$ miles deep, named Anachucuna Bay.

“PORT ESCONDIDO.—At the northwest end of this bay, about 2 miles to the south of Carreto Point, is the little harbor of Escondido, adapted only for coasting vessels.

“CAPE TIBURON.—The northwestern extremity of the Gulf of Darien is rocky, high, and scarped; projecting boldly out to the northeast, it forms on each side a small harbor. That to the southward of the neck is so narrow as to be of little use, but Miel Harbor, on the west side, has good holding ground of sand and clay, in 11 to 12 fathoms water.

“GULF OF DARIEN.—The entrance to this gulf is formed between Cape Tiburon and Caribana Point, which are 29 miles apart; and from this line the gulf is 46 miles long.

“THE WESTERN SHORE.—From Cape Tiburon the coast takes a southeasterly direction for about 12 miles to the Gandi River; midway between, a mile offshore, lies Tonel Island, which is steep-to on its east side.

“From Gandi River to the point of that name the shore trends about southeast about $1\frac{2}{3}$ miles, forming Estola Bay, into which the little Estola River empties, but neither the river nor the bay is of any importance.

“From Gandi to Tripo Gandi Point a low sandy shore trends nearly east-southeast about 6 miles, forming Gandi Bay. Piton Islet, steep-to, lies one-half mile from the coast. At 3 miles S. 56° E. (S. 61° E. mag.) are the Bolanderos Islets, which consist of one large islet, with several small ones to the southward of it, all of them clear and bold and not farther than three-fourths mile from the shore. Tambor Islet lies 3 miles to the southward and eastward and rather more than one-half mile from the shore; at about one-half N. 28° E. (N.

23° E. mag.) of it a rocky shoal shows itself, between which and the islet there is a clear passage; it is, however, always better to pass outside. To the westward of Tambor Islet the shore forms a bay named Port Escondido, which affords shelter for small vessels. The Tumate islets, three in number, one-half mile from the coast, are 4 miles farther on. Four miles from the Tumate Islets are the Tarena Cays, which lie close to the shore.

"The whole of the coast between the Tarena Cays and Cape Tiburon is high, bold, and clear of danger, but it is very wild in the season of the breezes. At this period the eastern shore of the gulf should be kept aboard, where good anchorage will be found, if necessary, and a smooth sea for working to windward.

"At $2\frac{1}{2}$ miles southeastward of the Tarena Cays the shore takes an easterly direction for 6 miles to Revesa Point, forming the northern boundary of the delta of the Atrato. The principal mouth of the river opens out about 3 miles to the westward of the point; but being so exposed to the breezes, the commerce is more conveniently carried on by means of the little Faisan Branch, which has the advantage of the adjacent anchorage in Candelaria Bay.

"The sand thrown out of the main branch is deposited at a long distance, and this part of the coast should not be approached nearer than 2 miles.

"In the bight, at 5 miles west of Revesa Point, a hill named the Peak of Tarena rises near the shore, and thence a lofty ridge, having several remarkable peaks, stretches in a north-west direction as far as Cape Tiburon; the southernmost is named Candelaria, the center one Gandi, and the northernmost Pico de Cabo. The latter rises beyond Cape Tiburon.

"The western shore of the gulf, for the distance of about 20 miles from its head, is low, swampy, and irregular, being formed by the delta of the Atrato River, which enters the gulf by numerous branches, eight of which are navigable for canoes and bungs. At the outermost part of the delta the gulf is contracted to a width of only 4 miles.

"ATRATO RIVER, probably the fourth largest river in volume in South America, rises in a spur of the Antioquian Range that connects the latter with the divide or Cordilleras of Darien. Flowing on a course generally north for several hundred miles, it empties through thirteen mouths into the

Gulf of Darien. It has numerous tributaries on both sides. This river was surveyed by Commander Lull, U. S. Navy., for 160 miles, or as far up as the mouth of the Bojaya. Its banks are low, and for the whole of this distance, during the wet season, are overflowed to a depth of 3 or 4 feet, from which cause all the houses are built upon piles. Below Sucio there are no inhabitants upon the banks, as they are submerged ten months of the year. This river resembles the lower Mississippi in grandeur of proportion, with its long reaches, its width varying from 500 to 825 yards, and its great depth, often exceeding 10 fathoms. Its current varies from 2 to 3 knots per hour, which would be much increased in the rainy season but for the overflow of the banks, which permits an escape of the surplus water by spreading for miles over the adjacent country.

"The survey was made in a rowboat floating down with the current, and nowhere in the channel were found less than 28 feet. Over the whole distance surveyed no rocks were found; the bottom was muddy, and the river unobstructed by snags. So well defined is its channel and so free from obstructions that a single passage up and return would be sufficient to make one acquainted with the navigation.

"The mouths of the Atrato are obstructed by bars, upon which there will not be found more than 6 feet of water. They differ in character, however, according to their protection from the sea. The Uraba mouth, being farthest from the sea, and also protected by a long sand spit, is fixed in its nature, and the bar is of hard sand. These bars, as they increase by fresh deposits, extend out and break off abruptly from 2 to 10 fathoms.

"The extensive delta projects far beyond the limits of the mainland, and banks, composed of a deposit of the softest ooze, extend about a mile outside the bars, exposed, however, to constant changes, especially during the season of the breezes.

"REVERSA BAY.—From Revesa or Choco Point to the northwest point of Candelaria Bay the low mangrove shore trends about south by east 5 miles. Revesa Point, projecting a little to the eastward, affords off its south side good anchorage with northerly winds. Vessels entering the Revesa anchorage may pass within 300 yards of that point, and anchor as soon as it bears eastward of north in 13 or 14 fathoms.

The sand bank skirting Candelaria Bay gradually disappears as Revesa Point is approached.

“CANDELARIA BAY.—On the north side of the delta of the Atrato there is a bight about $2\frac{1}{2}$ miles in extent, named Candelaria Bay. The land around, however, is so low that the greater part is inundated, even at low water; and it is bordered with mangroves, reeds, and rushes, so that only the northwest part of the bay appears dry. A sand bank skirts the whole circuit of the bay and extends a mile southeastward from the northwest point, which reduces the entrance between it and the mouth of the Little Faisan branch of the Atrato to scarcely a mile in breadth. Off the mouth of the Faisan, and along the southeast side of the bay, however, the bank does not reach to more than about 300 yards from the shore, leaving a space of good anchorage about $1\frac{1}{3}$ miles in extent.

“The bar of the Little Faisan has 3 feet of water upon it, and it is one of the best branches by which canoes enter the Atrato.

“DIRECTIONS.—To enter Candelaria Bay great attention is required to the soundings, care being taken not to shoal in less than 17 fathoms in the entrance nor 12 within. This caution is absolutely necessary, for the sand bank that skirts the shore is so steep that it shoals suddenly from 13 to 5 fathoms, and from 5 to getting aground. By preserving a proper depth a vessel will pass about 800 yards off the southeast point, and, having entered, the discolored water on the edge of the bank may be seen from aloft.

“TIDES.—The tide in the Gulf of Darien rises 2 feet.

“THE EASTERN SHORE.—From the head of the Gulf to Uraba Point the eastern shore trends nearly north 29 miles, and is very low and swampy, the only remarkable object being the little hill that forms Cayman Point 9 miles from Uraba Point. The soundings are regular, and this shore may be easily navigated with proper attention to the lead. The head of the Gulf is about 10 miles in breadth, and the Suriquilla River flows into the middle of it.

“From Uraba Point the shore, which is low, with a few small hillocks, trends about north-northwest for 6 miles to the Salado River, and thence for about $5\frac{1}{2}$ miles in a westerly direction to Arenas Point, a low, sandy peninsula, bold and steep-to.

“From Arenas Point the shore trends to the northward for about 3 miles, when it bends abruptly to the northeastward to Caribana Point, the north point of the low, sandy peninsula, about $2\frac{1}{2}$ miles in breadth at the extremity from north to south. The west face of this peninsula is bold and steep-to, and may be safely coasted at the distance of a mile. The interior is occupied by the Aguila Lagoon, about $5\frac{1}{2}$ miles in extent from east to west, in which are many mangrove cays.

“CARIBANA POINT is low and wooded. At a short distance within the point is Cerro Aguila, and, although of only moderate height, it is remarkable from standing alone in the middle of low land, and is a useful guide.”—*Hydrographic Office, Gulf of Mexico and Caribbean Sea, No. 64.*

DESCRIPTION OF THE PACIFIC COAST.

“COAST.—Between Burica Point and the southwest extremity of Parida Island, 32 miles N. 85° E. of the point, the coast recedes 17 miles in a gradual curve, forming a large bay, within which are no known dangers. On the northern shore, which is low and wooded, are the small rivers Bartolome, Pinos, an Piedra, but no port or place of resort. The western shore is higher and deep water approaches nearer to it. The open anchorage along the coast is considered in general safe.

“The delta of the David River lies on the eastern side of the bay north of Parida Island and is formed by numerous low islands fronting the coast for a distance of 17 miles, from the Boca San Pedro on the west to Boca Chica on the east, covered by extensive shoals with heavy breakers. Within the islands the low coast is a labyrinth of small streams and osteros.

“BOCA SAN PEDRO, about 30 miles N. 60° E. from Burica Point, between the large islands San Pedro and Sevilla, is the westernmost and main entrance to the David River and the shortest approach to the city of that name. The original surveyors, both British and French, regarded this entrance as impracticable for vessels and even for boats, although used by the native fishermen, and considered the Boca Chica, with the connecting 25 miles of intricate navigation, the only practicable approach to the river and city of David.

“A sketch survey made in 1900 by Mr. J. A. Rupert Jones, of the Pacific Steam Navigation Company, and now incorporated on the latest charts of the locality, shows a close line of

soundings across the bar in a comparatively straight course, with a least depth of 4 fathoms, to an anchorage in $4\frac{1}{2}$ fathoms about three-fourths mile northward of San Pedro Point, the southeast end of San Pedro Island. The channel is dangerous with a heavy southwest swell, and the banks bordering the channel on the eastern side within the bar and opposite San Pedro Island are extending westward; the present width of the channel abreast of San Pedro Point, which it closely skirts, is about 700 yards, the width of the opening between San Pedro Point and Powis Point, the western extremity of Sevilla Island, being nearly $2\frac{1}{2}$ miles. On San Pedro bank, which forms the west side of the channel, the sea breaks heavily, and along the edge of the bank incessantly.

"The German bark *Theodore*, of 680 tons, registered, crossed the bar of the Boca San Pedro February 2, 1892, and lay at the anchorage above San Pedro Point until March 24, when, having loaded a cargo of brazil wood, she passed out, drawing 15 feet, being the first large vessel to visit the port. Captain Saunders of the steamer *Elvira*, of 200 tons, on whose recommendation the *Theodore* was chartered and who towed the vessel into and out of the harbor, appears to have been the first to discover a navigable channel across the bar and the first to make general use of it. At the time of the *Theodore's* visit the coasting steamers calling at David, although with Punta Arenas as a farther destination, made the long circuit by the Boca Chica.

"ANCHORAGE.—There is good anchorage off the entrance to the channel in 13 fathoms with the southeast end of San Pedro Island bearing N. 29° E. (N. 23° E. mag.) and distant $3\frac{1}{2}$ miles. The water shoals gradually shoreward, and a mile farther in on this bearing there are 8 fathoms. From the anchorage here given, to enter the port the course is first N. 12° E. (N. 6° E. mag.) for $1\frac{1}{2}$ miles, then N. 57° E. (N. 51° E. mag.) $1\frac{1}{2}$ miles, then N. 17° E. (N. 11° E. mag.) $1\frac{1}{2}$ miles to the inner anchorage, the last course for half the distance skirting the east side of San Pedro Island at about 200 yards.

"CAUTION.—On account of the liability to frequent and sudden changes of all open sea bars, it would manifestly be imprudent to use this channel without a pilot or prior investigation by boat.

"CIUDAD DE DAVID, the capital of the province of Chiriqui, with 9,000 to 10,000 inhabitants, lies about 10 miles north of

San Pedro Island and the river mouth and about $2\frac{1}{2}$ miles from Pedregal, a small village on the right bank of the western branch of the river. From the anchorage within San Pedro Point a least depth of three-fourths fathom can be carried $10\frac{1}{2}$ miles to Pedregal and a couple of miles beyond, the small coasting steamers of 200 tons ascending to the village, whence a road leads across a treeless grassy plain to the city. This plain gives good pasturage to many horses and cows. On nearing the city the character of the country changes and hills occur; the ground is more or less cultivated and is divided up by fences. Nothing, however, appears of the town until the first houses are reached. It does not present a striking appearance, consisting for the most part of bamboo huts and wooden houses with thatched roofs and clay floors. Nevertheless, there are many well furnished stores in which can be bought at a reasonable price all that one may wish. There were at the time of the *Theodore's* visit but few foreigners settled in David, among them being a German physician, here stranded, and a few Italian laborers.

"SUPPLIES.—Meat, poultry, eggs, rice, yams, and fruit are abundant and cheap. The price of a live ox is \$12 to \$14. Only flour is dear. Good drinking water can be obtained from the river at the junction of the eastern and the western branch, above the Hacienda Pino.

"Sevilla and San Pedro islands abound in game, which is easily obtainable. The latter island is a private possession and consists of open grass fields and dark forests, giving support to some hundreds of cattle and numerous horses and swine. Of human dwellers there are here only the so-called matador, who has the supervision of the cattle, and a few nomadic Indian fisher people. The soil, though fruitful, is not cultivated.

"CLIMATE.—The climate, in the dry season at least, was considered by the captain of the *Theodore* to be not unhealthy. During the seven weeks of the *Theodore's* stay at San Pedro, February 2 to March 25, there was not a single case of sickness on board, although the days were hot and all the work of discharging ballast and taking in and stowing the cargo of brazil wood was done by the men. The nights were always agreeably cool and there were no mosquitoes.

"PARIDA ISLAND is of irregular shape, about 4 miles long

NNE. and SSW., and 2 miles wide in its widest part. It is well wooded, but not high, and has rivulets affording abundance of water. Numerous islets with many sunken reefs among them lie off the east and southeast sides of the island to a distance of 5 miles, all of them being apparently within the line of 10 or 12 fathoms. Bolano and Baraco, the largest of these islets, terminate the group, lying about $4\frac{1}{2}$ miles east of the south end of Parida. The chart shows at 2 miles eastward of them several rocks awash, and at about three-fourths mile southward of Baraco several rocks under water. Close to both groups are soundings of 12 fathoms. Channels doubtless exist among the islets and reefs, but vessels must keep outside of them, as they have not been closely examined, and in approaching David Bay from the southwestward give the whole locality a good berth.

“PARIDA ANCHORAGE.—The only anchorage is at the northeast end of the island, in $6\frac{1}{2}$ fathoms, sheltered from the southward by the long, low island Gami. Here there is a sandy beach for landing and abundance of good water. To reach this anchorage from the eastward from a position west of Widow Rock steer for the San José islands, and then, leaving these islands to the northward, steer for the north end of Parida, maintaining a depth of 7 to 6 fathoms, but decreasing to $3\frac{1}{2}$ fathoms as the anchorage is approached, when it deepens again to $6\frac{1}{2}$ fathoms at the anchorage, close to the shore.

“A narrow channel with 8 to $3\frac{1}{2}$ fathoms of water leads seaward close around the north end of the island.

“BOCA BRAVA, between Sevilla and Brava islands, lies $5\frac{1}{2}$ miles north of the north end of Parida, from which a channel leads through the shoals in almost a straight course with a least depth of 3 fathoms, deepening between the islands to 6 fathoms, and within to 9 fathoms. There is no information as to this channel being used to reach an anchorage within the islands or to communicate with David, although as the entrance is exactly marked by the north point of Parida and the channel more sheltered than that of San Pedro and deeper than the Boca Chica it would appear to have at times decided advantages.

“CHIMMO BAY, at the southwest end of Parida Island, is small, with depths of 10 to $2\frac{1}{2}$ fathoms. The Santa Cruz Islet fronts the bay, and the passage in is north of the islet, some

rocks extending southward from it to the shore. A reef also runs southward a short distance from some islets on the north side of the bay. Good fresh water may be obtained in the northeast part of the bay.

“TIDES.—High water, full and change, in Chimmo Bay is at 3h. 15m.; rise of tide, $10\frac{1}{2}$ feet.

“CAUTION.—The southwest point of Parida Island should be given a berth of about a mile on account of some sunken rocks one-half mile from it, with depths of 15 and 16 fathoms close to them.

“GRONO ROCK, with a depth of 6 feet over it and 30 fathoms close to, has been reported to exist $3\frac{1}{2}$ miles S. 37° W. (S. 31° W. mag.) from Santa Cruz Point. Breakers were seen in this locality by the master of the steamship *Casma*, who was informed by a diver engaged in the pearl fishery of the existence of the rock, with particulars as above. It has been entered on the chart as doubtful in position.

“DAVID BAY, as named by the original surveyors, lies between Parida Island and El Juco Point, 11 miles N. 67° E. of the SE. part of the island, the name being also given on the present chart to the great bay west of the island. In it are numerous islands and rocks, but with the assistance of the chart little difficulty should be experienced in selecting an anchorage.

“THE MONITAS are two islets on a reef lying about a mile nearly south of Juco Point. The western islet closely resembles a saddle. The channel between the Monitas and Juco Point is considered unsafe on account of the currents in it, although the depth is from 7 to 8 fathoms; hence vessels making for Palenque anchorage generally pass to the southward of these islands.

“VIUDA OR WIDOW ROCK, lying $2\frac{3}{4}$ miles S. 11° E. of the western Monita, is an isolated rock with a reef extending from it one-half mile in a direction S. 69° E. At low water four pinnacles are uncovered, but at high water only one is visible. As this rock and reef are both steep, with soundings close around them of 10 to 12 fathoms, great care is required in avoiding them. It is said that to vessels approaching David Bay from the southward the position of the Viuda may generally be known by breakers, but whether this be the case or not, lying in the fair way of vessels and so far from the shore, it is a very formidable danger.

"A sunken rock, the existence of which there is great reason to doubt, was many years ago reported at about 4 miles SSE. mag. from the Viuda. The French surveying vessel *Obligado* searched for it unsuccessfully, although assisted in the search by a native who stated that he had seen breakers upon it; it was said to show but very rarely. The difficulty of finding an isolated sunken rock in deep water is well known; hence it will be prudent to exercise more than ordinary vigilance when in the vicinity of this reported danger, especially as no soundings are recorded about the site.

"EL BUEY, a dangerous rock of small extent in the middle of David Bay, with soundings of 5 to 7 fathoms close to it, only uncovers at half tide, not showing at all in fine weather at high tide. No well-defined landmarks can be given for this danger, but it lies $1\frac{1}{4}$ miles N. 49° E. from the summit of the highest San José islet and 3 miles N. 78° W. from the western Monita. The chart shows the rock to be on the range of the southeast extremity of the San Jose group, the southernmost of the Linartes, and the NW. tangent of Bolano.

"SAN JOSÉ islets are a group of four wooded islets united by a reef. They are safe of approach except that the reef projects from them one-fourth mile to the eastward, and a 2-fathom spot lies three-fourths mile to the westward. Midway between San José and Bolano islands is a cluster of islands named Linartes.

"PALENQUE ISLAND, of irregular shape, 256 feet high and about $1\frac{1}{2}$ miles in extent, lies on the south side of Brava; Deer Islet, on which was the observation spot of the survey, lies off the southeast point of Palenque. The shoal water which limits the bay trends about NE. by N. and SW. by W. from Deer Islet.

"PLAYA GRANDE BAY, lying north of Juco Point and the chain of islands extending from the point to the Boca Chica, has many sunken reefs in it and has not been closely examined. The passage south of Carre Island into the bay, nearly a mile wide, has 6 fathoms of water, and this depth is carried about three-fourths mile inside, gradually decreasing to 3 fathoms at about 700 yards from the eastern end of the bay, where there is excellent shelter for a small vessel. Chuchegal Bay opens from the northeastern part of Playa Grande and extends about $1\frac{1}{2}$ miles northeastward, to the base of Red Hill, but has not been sounded out or closely examined. The

country behind the bay affords abundant pasturage for large herds of cattle.

“BOCA CHICA, $3\frac{1}{2}$ miles N. 65° W. of Juco Point, the narrow channel between Ventana and Saino islands leading into the David River, is practicable for only light-draft vessels, there being in some parts of it at low tide only 8 to 10 feet of water. Boca Chica may be recognized by the rocks of Ventana Island, which have been pierced by the sea. Lavandera Rock, an isolated danger, covered at high water, lying on the east side of the entrance 300 yards southward of Saino, must be carefully guarded against, there being a depth of 5 fathoms close to it on the south side. Within the entrance, at the east end of Brava Island, the channel expands and forms an anchorage called El Pozo (the well) with a depth of 6 fathoms. The village of San Lorenzo is partly in sight at the western end, consisting of about a score of huts in the midst of orange and banana trees.

“ANCHORAGE.—During the fine season there is good anchorage off the Boca Chica in 5 fathoms, sheltered from the northerly winds which have then considerable strength. When the southwest winds prevail it is better to anchor farther out under shelter of the San José islets.

“A more open anchorage, suitable for large vessels, is in 8 fathoms midway between San José islets and the Monitas.

“TIDES.—High water, full and change, at Palenque and Parida anchorages is at 3h. 15m.; springs rise $10\frac{3}{4}$ feet, neaps 8 feet. During the *Obligado's* visit the flood stream at the anchorage outside the Boca Chica was observed to set NNW., and the ebb in the opposite direction, with an average strength of 1 mile an hour, diminishing in force toward the San José and Monitas islands. Within the entrance and in the river the current was much stronger.

“SUPPLIES.—At the village of Boca Chica or Puerto San Lorenzo, on the north side of the river and $3\frac{1}{2}$ miles from the sea, cattle, poultry, eggs, fruit, and vegetables can be procured. Water of good quality can be got from the stream immediately east of the village.

“DIRECTIONS.—Vessels from the westward or southward should pass between the Viuda and the rocks east of Bolano, and if from the eastward, between the Viuda and the Monitas, in either case steering for the San José islets on a safe bearing until well past Viuda. If intending to anchor off

Boca Chica, when west of Viuda steer for Carré Islet, and when one-half mile from its south point continue along the south side of the chain of islets to the anchorage.

"THE LADRONES are two rocky, barren islets of moderate height, and together not more than a mile in extent, lying 14 miles S. 20° W. (S. 14° W. mag.) of the southwest point of Parida. They are very steep-to, with 70 fathoms close to their southern edge. The only known dangers are some rocks extending from them to the northward about 2 miles, and a very dangerous reef at 4 miles in the same direction with only 6 feet of water over it at low tide. As this reef is only shown by breakers when there is a stiff breeze, it must be carefully guarded against.

"MONTUOSA ISLET," lying 27 miles S. 25° E. (S. 31° E. mag.) from the Ladrones and 22 miles west of Coiba Island, the nearest land, rises to a height of 500 feet and has its summit covered with cocoa and other trees. A narrow reef, partly above water, extends from it about 3 miles in a westerly direction, and a reef also runs off from its southeast side. Captain Colnett landed here in 1794 and obtained a quantity of cocoanuts and a few birds. He mentions that the bottom on the south side of the island and also the shore near the sea is rocky. A sandy beach was found behind some little creeks that run in between the rocks, which afforded a safe landing place for boats. There was a great plenty of parrots, doves, and iguanas, and probably other refreshment.

"SECAS ISLANDS are a group consisting of three principal islands and numerous islets and rocks, covering an extent of $5\frac{1}{2}$ miles in latitude by 3 miles in longitude, and lying about 15 miles from the coast between David Bay and Port Nuevo. About and among them are no known sunken rocks the positions of which are not usually indicated by breakers. Small vessels may find good shelter here, and on some of the islands a landing may be effected; but no fresh water can be obtained. The best anchorage is stated to be in 10 to 12 fathoms, on sand.

^aThe center of Montuosa Islet, as cut in February 5, 1902, by the U. S. S. *Concord* from numerous positions of the ship obtained each time by not less than three cross bearings of Jicarita, Quibo, and the Ladrones Islands was found to be about $2\frac{1}{2}$ miles N. 44° E. (N. 38° E. mag.) of the charted position, approximately in latitude $7^{\circ} 29' N.$, longitude $82^{\circ} 13' 30'' W.$

“LA BRUJA ROCK, about 3 miles east of the north end of the largest island, is a formidable danger, especially at night. It is stated by some authorities to be almost awash at low water and by others to be awash at high water, and is surrounded by depths of 20 to 24 fathoms.

“CONTRERAS ISLANDS, a group about 14 miles southeastward of the Secas and $9\frac{1}{2}$ miles north of Coiba, composed of two principal islands with many small islets and rocks, are uninhabited and have no good anchorage. Vessels may approach these islands without hesitation if due precaution be taken, as the depths near them are from 30 to 40 fathoms and it is believed that there are no sunken dangers among them that are not marked by breakers.

“PROSPER ROCK, so named from the wreck of *Le Prospère*, a French ship that was drifted onto it in a calm, lies about $1\frac{1}{2}$ miles south of the southern island and has the appearance of a black tower. A reef which uncovers at low water of spring tides extends from it about 200 yards in a south-westerly direction. It is not safe to pass between Prosper Rock and the islands on account of a reef midway in the channel, which is partly dry at low water.

“COAST.—At $1\frac{1}{2}$ miles east of Juco Point the coast turns northward for $3\frac{1}{2}$ miles to the mouth of San Lorenzo River, and thence trends S. 77° E. for 20 miles to Espartal Island, at the mouth of the river of Pueblo Nuevo. Nearly all this shore is low and fronted by a sandy strand; the entrances of the various rivers are barred and can usually be recognized by the white trunks of the mangrove trees, the tops only being in leaf. About a dozen miles inland is a range of hills between which and the sea is a wooded plain.

“There are no known sunken dangers along this coast, and vessels may skirt it at a distance of 2 to 3 miles in soundings of 6 to 11 fathoms. Some cliffs of red color eastward of San Lorenzo River and ending at about 13 miles from Pueblo Nuevo are very conspicuous.

“VENADO ISLANDS, on the east side of Juco Point, consisting of one large island near the point and three small ones on a bank about a mile to the eastward, are said to be a good mark for vessels approaching from the eastward.

“SAN LORENZO BAY, formed by the bend in the coast east of Juco Point, is so thickly strewn with rocks that all vessels should avoid entering it, and for the same reason the river

can be approached only in boats. A considerable village lies on the San Lorenzo River, a few miles from the sea.

"PORT NUEVO lies just within the southern mouth of the Pueblo Nuevo River, now charted as Rio San Lucia, or Remedios. The entrance, which is south of Silva and Insolita islands, from whatever direction approached may be at once recognized by the peculiar formation of the Cayado Hills, which rise to heights of 300 and 400 feet from the narrow peninsula forming the south side of the port, and from a distance appear as two islets. Sugarloaf Hill, 540 feet high, standing close to the shore near Espartal Island, is a good mark for the port, as are also the two wooded islets, Silva de Tierra and Silva de Afuera, distant, respectively, $1\frac{1}{4}$ and $4\frac{1}{4}$ miles westward from Entrada Point.

"Espartal and Insolita, two large marshy mangrove islands made of the soil brought down by the floods, front the coast for a distance of 7 miles, forming the river delta. The Boca de Santiago, between the two islands, although the direct entrance to the river, is navigable only by boats and at high tide, being obstructed by shoals through which, in 1899, there was no channel; the narrow passage north of Espartal is also unnavigable.

"From Aguda Point, the south end of Insolita, the Belitre Bank, partially dry at low water, extends $1\frac{1}{4}$ miles westward along the north side of the channel, ending opposite Entrada Point, and forms a natural breakwater for the port. The rocky islet Intrusa, steep and safe of approach on all sides, lies nearly in mid-channel between Aguda Point and the south shore. Robalo Island, three-fourths mile northeastward of Aguda Point, is about three-eighths mile in extent, with a channel on either side, a mud bank extending from it about the same distance to the southward. Numerous rocks are reported in the eastern channel, that on the Insolita side, though narrower, being the one recommended for use.

"Opposite the north end of Robalo is Dedo Point, from which the three remarkable Dedo (finger) hills, about 1,500 feet high, extend in a northeasterly direction, the line of the hills passing through Entrada Point. Herron Islet lies on the east bank of the river, opposite the south end of Robalo and three-eighths mile above La Tinta Cove. The south and east shores of the port are bordered by shoal water to a distance of one-fourth mile. Point Arenitas is at the

north end of Insolita, and $1\frac{1}{4}$ miles above is Rocky Point, which marks the real mouth of the river. Just within the rivers Jacobo and Santiago enter the San Lucia from the eastward.

“The bay is inhabited by a few Indians in ranchos or huts scattered along the beach, and there are said to be a number of small villages on the numerous streams that fall into the river, but by far the largest is that which gives to the river its name. San Juan Enfrente, a cattle corral and clearing, is on the right bank of the San Lucia, $2\frac{1}{4}$ miles above Rocky Point.

“Some eggs, fowl, vegetables, and fruit may be obtained. Belcher states that water can not be procured in any quantity, but Captain de Rosencot, of the *Obligado*, says that good water may be procured from a brook which falls into the small bay on the east side of Cape Cayado (Entrada Point).

“THE CHANNEL, according to the survey of 1854, supplemented by an examination in 1900 by Mr. J. A. Rupert Jones, of the Pacific Steam Navigation Company, carries a low-water depth of 6 to 8 fathoms as far as Intrusa Islet, the width north of Entrada Point being about 400 yards and increasing within to about 750 yards near the islet. Farther in the depth is quite irregular, but 4 fathoms at low water may be carried more than a mile, probably 3 fathoms to Rocky Point, north of Insolita, and 1 fathom a considerable distance farther up the San Lucia.

“The anchorage selected by the French surveying vessel *Obligado* in 1854 was immediately southward of Intrusa, with the islet in range with the south end of Insolita. Eastward of this the channel expands considerably, but there are several isolated shoal spots, $2\frac{1}{2}$ and 3 fathoms, restricting the anchorage space and making it inconvenient for large vessels. To a draft of less than 16 feet it offers the advantage of ample space, with protection from all winds. A few small buoys to mark the shoal spots and the ends of the shoals would greatly increase its usefulness for large vessels. Excellent ranges are afforded by Intrusa Islet with Entrada Point and the two Silvas.

“Westerly winds, frequent from June to October, are said by the inhabitants to send occasionally into the river a very heavy sea, which causes considerable inconvenience to vessels anchored near Intrusa. At such times it will be advisable to run to the inner anchorage.

"TIDES.—High water, full and change, at Port Nuevo is at 3 h. 44 m., rise of tide about 10 feet; at San Juan Enfrente at 4 h. 30 m.; rise 12 to 16 feet.

"PUEBLO NUEVO VILLAGE, now Los Remedios, is said to be at some distance within the river, north of Insolita Island, and the passage up to it so intricate that it can only be found by native guidance. Provisions are said to be obtainable here in considerable quantities. The principal article of trade is the sarsaparilla, that of this neighborhood being esteemed of a superior quality. A venomous species of serpent, the bite of which is fatal, is numerous on the mainland and on the islands.

"DIRECTIONS.—To carry 6 fathoms, the best water, into the port the entrance should be approached on a north course, keeping from one-fourth to one-half mile from the shore just below Entrada Point, in order to avoid the shoal water westward of the point and the bank with 4 to 5 fathoms extending southeastward from Silva de Tierra. When Intrusa Islet opens from the point, steer for the islet, passing close to the point, and when within steer to pass southward of Intrusa to the inner anchorage, or anchor in 9 fathoms, fine sandy bottom, on the range of Intrusa and Aguda Point. Entrada Point, in line with the north end of Silva de Afuera, leads through the narrowest part of the channel between Belitre Bank and the shoal water to the southward.

"From Aguda Point about a mid-channel course leads up the river as far as Rocky Point, above which the channel passes between wide shoal banks on either hand and ascends the western stream.

"The best time to enter the river is with the flood stream and the wind from seaward; and to leave the river, with the land wind and a little before the end of the flood. Vessels must pass south of Silva de Tierra, but may pass between the two Silvas, the depth here being from 8 to 12 fathoms. By entering at the first of the flood the edges of the banks are plainly seen.

"COAST.—From Port Nuevo the coast has a general trend of S. 30° E. for 23 miles to the entrance of Bahia Honda and is quite irregular in outline, being intersected by several rivers and indented by a number of small bays, of which the principal are Pajaros, Rosario, and Monita, all of them open and exposed to winds from the westward. About 3½ miles

southward of Entrada Point is the Tavasera River, which has no bar at its mouth, a channel with from 2 to 3 fathoms leading in to an anchorage ground of considerable extent, with a depth of only 1 to 4 fathoms. Negro Bluff, west of the entrance, is at the southwest end of a round-shaped peninsula about a mile in diameter, occupied by a low hill of gradual ascent and connected with the northern shore by a very narrow neck. Between the Cayado Peninsula and Negro Bluff the coast recedes considerably, forming an open bay, which appears to be free from danger, with 3 to 4 fathoms at one-fourth of a mile from the low shore. The Nueces Rocks lie at the northern end of this bay, the entire group lying within one-fourth mile of the beach.

"Below the Tavasera River the coast is fronted for a distance of 8 miles by a long sandy shelf, called the 'Playa Brava,' extending from 1 to 2 miles from the low shore, with depths of 1 and 2 fathoms, and covering in the southern part the mouth of Lavenia River, 7 miles from the Tavasera. This bank is steep-to, and should be approached with care, keeping outside the 10-fathom line.

"PAJAROS BAY, about 2 miles south of the Lavenia River, between Pajaros and Muertos points, is about a mile in width and depth, with from 16 to 18 fathoms of water. Rosario Bay, separated from Pajaros by a narrow peninsula ending in Muertos Point, is recognizable by the isolated pointed hill terminating this point, and by a small round islet, called 'Muela,' in the middle of the bay, about a mile from the shore. Rosario Point projects into the bay at its middle, dividing it into two parts, the southern of which is called Pivay Bay. A stream discharges at the head of each bay.

"GORDA POINT, of blunt shape and 2 miles broad, separates Pivay from Monita Bay, which is so named from a wooded islet in its northern part near the shore. Ventana Point, limiting Monita Bay on the south, is 1 mile north of Roble Point, which fronts the north side of Medidor Island and is $2\frac{1}{2}$ miles from the entrance to Bahia Honda.

"These bays, being open to the westward, afford anchorage only in the fine season. In each bay are found a few Indian families, who live by hunting and fishing.

"MEDIDOR ISLAND, of irregular shape and moderate height, about $1\frac{1}{2}$ miles long and five-eighths of a mile in average width, lies about 2 miles northwestward of the entrance to

Bahia Honda, and is separated from the coast by a narrow and rocky channel less than one-fourth mile wide, which is not recommended for use. Pacora or Trucha Islet, lying three-eighths mile south of Medidor, is about one-fourth mile long and 100 yards wide. A reef extends about two-thirds across the passage, leaving a narrow channel between its end and the islet, with a depth of 24 fathoms. Both Medidor and Pacora appear to be bold and steep-to, the water being from 20 to 30 fathoms deep in their vicinity, but should not be approached too closely on the northern and western sides on account of the deficiency of soundings.

“BAHIA HONDA (deep bay), lying 14 miles northeast of the north end of Coiba Island and 23 miles NW. by W. from Zurron Point, the west end of Cebaco, is an excellent harbor for vessels of the largest size, being deep, safe, capacious, and very easy of access. The entrance, between Guarida Point and Sentinela Island, is seven-eighths mile wide, and the harbor within is 2 miles long and wide, exclusive of the extensive mud flats in the eastern part of the bay, deep water lying in general close to the shores, which, as a rule, are clean and safe of approach.

“GUARIDA, the north entrance point, is bold and clean, and may be approached close-to, there being 20 fathoms of water at from 100 to 200 yards.

“SENTINELA ISLAND, forming the south entrance point, lies seven-eighths of a mile south of Guarida Point. It is small and surrounded by rocks, which, on the south, extend as far as Cono Islet. A detached reef lies about 400 yards to the northeastward. Sentinela and Cono are separated from Cape Jabali by a narrow rocky channel, with rocks on both sides and practicable only for boats.

“Between Guarida Point and Sentinela Island the depths are from 20 to 25 fathoms for almost the entire width of the channel, which is clear and free from dangers, except the rocks and reefs close to the island. Within the entrance the depths decrease gradually to 10 and 12 fathoms at $1\frac{1}{4}$ miles.

“TALON ISLAND, lying about $1\frac{1}{4}$ miles within the harbor and opposite the entrance, is about five-eighths of a mile long, north and south, and 120 feet high. Two small islets, Pueril and Espuela, lie respectively off the western and the southern point of Talon, and from the former islet a shoal and reef extend northwestward about one-fourth of a mile.

Talon Island separates the harbor into two anchorages, Chinche Bay to the westward and Legamo Bay to the eastward, the former being much the larger. On the northeast side of the island a narrow channel connects the two bays.

“CHINCHE ISLET is round and wooded, and lies in the northern part of Chinche Bay, about 600 yards from the shore; it is clean and safe of approach on all sides, with 10 and 11 fathoms close-to, to the southward.

“ANCHORAGE may be had in any part of the harbor, but the best berth for large vessels is in Chinche Bay south of the islet, in from 10 to 14 fathoms, mud bottom, sheltered from all winds. The only dangers in this locality are a rock covered by 8 feet of water about one-fourth of a mile northward of Guarida Point, and the reef lying 300 yards northwestward of Pueril Islet. Legamo Bay is clean, with an anchorage extent of three-eighths of a mile and depth of 5 to 7 fathoms, completely sheltered by Talon Island.

“TIDES.—High water, full and change, is at 3h. 10m. Springs rise $11\frac{3}{4}$ feet, neaps $8\frac{3}{4}$ feet. The tidal streams run from one-half knot to 1 knot an hour.

“SUPPLIES.—Vegetables and fruit are only obtainable in very small quantities. Water can be procured near a village on the southeast side of the bay; a boat can anchor here in calm weather and fill with a hose. Very good water may also be procured from a cascade outside the harbor on the north shore, at $1\frac{1}{2}$ miles from Guarida Point. The water falls upon a rock, which affords facilities for fixing a hose.

“Captain de Rosencot states that the Indians are expert turtle catchers and will furnish a large quantity daily. Fish were abundant.

“DIRECTIONS.—The entrance of the bay does not make out well at a distance, but its location is so plainly marked by the islands Afuera, Medidor, and Pacora that it is readily found. After making out Afuera in mid-channel, Medidor will be seen and should be steered for until Pacora is made out or the entrance is opened. Then steer for Guarida Point, which may be ranged close-to, and when past it head for Chinche Islet and anchor in 11 to 14 fathoms, mud bottom, sheltered from every wind. The best time to leave the harbor with a sailing vessel is in the morning, when the winds that precede the sea breeze come from NE. to E. These are sometimes so light that the boats must be used to tow out. The channel

between Medidor and the coast and that between Medidor and Pacora should not be used.

"AFUERA ISLAND lies about midway between the north end of Coiba and the mainland, the channel being $13\frac{1}{2}$ miles wide. The island may be passed on either side, the only danger being a reef extending from its southeast point about 400 yards; at its extremity is a black rock almost covered at high tide. Afuerita Islet nearly touches the northwestern end of Afuera.

"COIBA OR QUIBO is the largest island off the coast, being 21 miles long, NW. and SE., with a width varying from 4 to 12 miles, and of moderate elevation. It is covered with forests and a dense and tangled tropical vegetation. The interior is said to consist of fine plains covered with magnificent forests, as yet untouched. In all parts there is abundance of good water. Around its shores are numerous anchorages, but no harbor in which a vessel may find protection from all winds.

"The western shore is bold, with deep water close to and clear of dangers not in close proximity to the shore. Hermosa Point is the northwest extreme of the island, and has deep water close outside the rocks and islets off it; eastward of it is Hermosa Bay, open to the northwestward, with a sandy beach at its head. It has not been sounded out, but has 20 and 14 fathoms in the entrance.

"Off the southern coast are several dangers, requiring caution in approaching this side of the island. A shoal nearly a mile in width extends about 5 miles along the shore from Negada Point, the southeast extremity of the island to Racimo Point. Hill Rock, a dangerous detached shoal with 6 feet of water over it, lies at $2\frac{1}{3}$ miles from the shore, nearly south of Racimo Point, and $5\frac{1}{4}$ miles S. 64° W. of Negada. Several shoal spots of 4 to 5 fathoms lie at $1\frac{1}{2}$ and 2 miles southwestward of Negada Point, with deeper water inshore. Barca Islet is a little over one-half mile southwestward of Racimo Point. Passage Rocks, a group above water, are about 2 miles west of Barca, and Logan Rock, also above water, lies about a mile northwest of the former, with soundings of 6 to 9 fathoms between them and the coast.

"DAMAS BAY, on the eastern side of Coiba, 6 miles northwest of Negada Point, is the principal anchorage. The bay is about 7 miles wide at the entrance between Fea and Clara

points, and penetrates 4 miles. At its head is a broad sandy flat, through which flows a small stream, the San Juan. There is good anchorage in any part of the bay, the depths gradually decreasing from 30 fathoms in the entrance to 10 and 12 fathoms within one-fourth mile of the flats at the head, which, on account of the considerable rise and fall of the tide, must not be approached too closely. Off the southern shore, between Fea and Observatory points, rocky shoals extend out about a mile and are steep-to, with 10 to 12 fathoms close to their edges. A narrow recess in the reefs here, with 5 to 8 fathoms of water, might with care afford protection from the SE. to a small vessel. From Fea Point to Negada Point shoal water extends one-half mile from the shore, and from Clara Point, for a stretch of 2 miles to the northward, a shoal extends nearly a mile from shore.

“TIDES.—High water, full and change, is at 3h. 10m.; springs rise about 12 feet. The ebb and flow are regular.

“SUPPLIES.—No fruit or vegetables are procurable; turtles abound, but are hard to catch; crabs, cockles, and oysters are plentiful. In the woods monkeys and parrots abound, and in Anson's time there were deer; but the interior is nearly inaccessible from the steepness of the cliffs and the tangled vegetation. Explorers should beware of alligators and snakes.

“ARENA BAY.—At Job Point, $2\frac{1}{2}$ miles north of Clara Point, the coast turns due west for 2 miles and then again to the northward, forming Arena Bay, in which the depth is convenient for anchoring over a large area, the depth at 2 miles from the shore being only 20 fathoms. At the head of the bay a sandy flat extends out one-half mile, and through it flows the Juncal River, which would appear to be the remarkable cascade described in the account of Anson's voyage. Pesado Rocks lie in the northern part of the bay, $3\frac{1}{2}$ miles from Job Point and three-fourths mile from the shore, and north of these, about a mile offshore, are the Cocos Islands; outside of these rocks and islands there appear to be no dangers.

“BALTASAR HEAD, the north extreme of the island, $7\frac{1}{2}$ miles N. 34° W. from Job Point, is a bold headland with deep water close-to. The channel between it and the Contreras group has soundings of 40 to 64 fathoms and no dangers except Prosper Rock.

“REMARKS.—The following interesting description of Coiba Island is found in the account of Lord Anson’s voyage around the world, by Richard Walter, the chaplain, published in 1776, thirty years after the voyage. It would seem that the island has changed but little up to the present day. The anchoring place at the *Centurion* was in Damas Bay.

“The island of Coiba is extremely convenient for wooding and watering, since the trees grow close to the high-water mark and a large, rapid stream of fresh water runs over the sandy beach into the sea, so that we were little more than two days in laying in all the wood and water we wanted. The whole island is of a very moderate height, excepting one part. It consists of a continued wood, spread all over the whole surface of the country, which preserves its verdure the year round. Among the other wood we found there abundance of cassia and a few lime trees. It appeared singular to us that, considering the climate and the shelter, we should see no other birds than parrots, paroquets, and macaws. Indeed, of these last there were prodigious flights. Next to these birds, the animals we found in most plenty were monkeys and iguanas, and these we frequently killed for food, for, notwithstanding there were many herds of deer upon the place, the difficulty of penetrating the woods prevented our coming near them, so that, though we saw them often, we killed only two during our stay. Our prisoners assured us that this island abounded in tigers, and we did once discover the print of a tiger’s claw upon the beach, but the tigers themselves we never saw. The Spaniards, too, informed us that there was frequently found in the woods a most mischievous serpent called the flying snake, which, they said, darted itself from the boughs of trees on either man or beast that came within its reach, and whose sting they believed to be inevitable death. Besides these dangerous land animals, the sea hereabouts is infested with great numbers of alligators of an extraordinary size; and we often observed a large kind of flat fish, jumping a considerable height out of the water, which we supposed to be the fish that is said frequently to destroy the pearl divers by clasping them in its fins as they rise from the bottom; and we were told that the divers, for their security, are now always armed with a sharp knife, which, when they are entangled, they stick into the belly of the fish and thereby disengage themselves from its embraces.

“While the ship continued here at anchor, the commodore, attended by some of his officers, went in a boat to examine a bay which lay to the northward; and they afterwards ranged all along the eastern side of the island, and in the places where they put on shore, in the course of this expedition, they generally found the soil to be extremely rich and met with great plenty of excellent water. In particular, near the northeast point of the island they discovered a natural cascade, which surpassed, as they conceived, everything of this kind which human art or industry has hitherto produced. It was a river of transparent water, about 40 yards wide, which rolled down a declivity of near 150 yards in length. The channel it fell in was very irregular, for it was entirely composed of rocks, both its sides and bottom being made up of large detached blocks, and by these the course of the water was frequently interrupted, for in some parts it ran sloping with a rapid but uniform motion, while in others it tumbled over the ledges of rocks with a perpendicular descent. All the neighborhood of this stream was a fine wood, and even the huge masses of rock which overhung the water, and which by their various projections formed the inequalities of the channel, were covered with lofty forest trees.

“RANCHERIA OR QUBITO is a small island, $1\frac{1}{2}$ miles by three-fourths mile in extent, lying 2 miles east of Baltasar Head, the north end of Coiba. The channel between the two islands is $1\frac{1}{4}$ miles wide, with soundings of 8 to 14 fathoms, and appears to be safe by keeping near the shore of Coiba and just outside the Cocos Islands. On account of the numerous rocks and uneven bottom, however, it is not recommended for use. Don Juan Rock, above water, lies nearly in midchannel. Aaron Rocks, a group of islets about a mile northwestward of Rancheria and $1\frac{1}{4}$ miles northeastward of Baltasar Head, are the outermost dangers in this vicinity.

“There is good anchorage south-southeast of Rancheria, opposite a sandy beach whence wood and water can be easily procured from the island. Some shelter is furnished by a high round islet. A Frenchman named Sorget was resident on Rancheria in 1847.

“JICARON ISLAND, 4 miles south of Coiba, is of triangular form, $3\frac{3}{4}$ miles long north and south, and well wooded; its highest point, 830 feet high, is on the east side, and the most extensive lookout, says Captain Colnett, is from the top of

this island, for it commands Coiba and the whole of the coast and bay to the northward. David Point, the northeast extreme, is clear and safe of approach, with deep water close to. Around the northwest extreme are numerous rocks and reefs, foul ground extending off three-fourths of a mile. A small group of rocks above water lies $1\frac{3}{4}$ miles N. 70° W. of Ursula Point, the south extreme of the island, and $1\frac{1}{4}$ miles offshore, closely surrounded by depths of 23 to 27 fathoms. About one-fourth of a mile south of Ursula Point is Jicarita Islet, $1\frac{1}{4}$ miles long and covered with cocoa palms.

“WEST COAST—JICARON ISLAND—CORRECTED HEIGHT.—The officer in charge of the Branch Hydrographic Office, San Francisco, Cal., reports that the master of the steamer *San Juan*, Captain Afredberry, states that as the result of observations on four consecutive voyages between San Francisco and Panama he finds the height of Jicarón Island (4 miles south of Coiba (Quibo) Island) to be (approximately) 1,400 feet instead of 830 feet, as given on the chart.

“THE CHANNEL between Jicarón and Coiba is practicable, but of very irregular depth, the best water, not less than 11 fathoms, being nearer Jicarón. Hill Rock, the principal danger in the approaches, lies $5\frac{1}{2}$ miles east of David Point.

“COAST.—From Bahía Honda the coast trends S. 68° E. for $20\frac{1}{2}$ miles to Brava Point, at the entrance of Montijo Bay, and is rugged, with several islets and rocks off it. At 2 miles from the land the soundings are 35 to 27 fathoms until the vicinity of the point is reached. Lorenzo Bay, about 5 miles westward of the point, is of considerable extent, but apparently foul, and has not been closely examined. In running from one bay to the other the coast should have a berth of not less than 3 miles.

“MONTIJO BAY extends northward about 14 miles, with an average breadth of 9 miles, and is fronted and nearly inclosed by the two islands, Cebaco and Gobernador, which lie in the entrance. Within the bay, near its head, is Leones Island, between which and the north side of Cebaco, a distance of 8 miles, is a continuous shoal with a depth of 2 fathoms, which occupies a large part of the area of the bay and leaves on either side but a narrow channel. Opposite Leones Island, on both sides of the bay, are several small streams accessible only by boat. The bay is of little value to shipping and seldom visited on account of the shoals and very irregular soundings. A closer examination or survey would make its

use quite practicable for steamers and afford to them a safe and sheltered harbor.

"CEBACO ISLAND is of irregular shape, $13\frac{1}{2}$ miles long, ENE. and WSW., and 3 miles wide at its eastern end, the broadest part. Some detached rocks lie immediately south of its western end, and a sunken rock lies about a mile from its eastern point, leaving no safe channel between. When entering the bay by this, the east, channel, it is necessary on account of this sunken rock to keep nearer to the main than to the island, the depths being 12 to 10 fathoms; steer then for San Juan Rock, distant about $1\frac{1}{2}$ miles from the land, until a 2-fathom spot in mid-channel $1\frac{1}{2}$ miles southward of the rock and in line with the east point of Cebaco is passed, and then steer to pass the rock on its west side at about three-fourths of a mile in 4 fathoms; hence, to the east side of Leones Island the course is about north (N. 6° W. mag.), westward of several rocks lying offshore, in soundings of 6, 7, and 9 fathoms.

"GOBERNADOR ISLAND, between the west end of Cebaco and the main, is about $2\frac{1}{2}$ by $1\frac{1}{2}$ miles in extent, and divides the western entrance to the bay into two channels, either of which is practicable, but the northern preferable because wider and less exposed to the strong outward current from the bay. The depth in the southern channel is 9 to 6 fathoms and in the northern 16 to 6 fathoms. There is good shelter for vessels of light draft under the west shore of the bay, which is easily reached. The banks throughout the bay are steep and require careful attention to the lead; vessels should not go beyond 4 fathoms.

"DUARTIS POINT, the eastern entrance point of Montijo Bay, lies 6 miles southeastward of Cebaco. Foul ground extends from it nearly 2 miles to the eastward.

"THE COAST south of Duarte Point is low and indented by two large bays, with a small stream at the head of each. The Quebra Islets, 6 miles below the point, extend to the westward about $1\frac{1}{4}$ miles from the bluff projection of the coast separating the two bays. Vessels should keep at least 2 miles from this stretch of coast, as it has not been closely examined.

"At 14 miles south of Duarte is a bluff headland, and one-half mile off it is the rocky but wooded islet Naranjas, which is steep, with deep water close outside.

"MARIATO POINT, 5 miles SE. of Naranjas Islet and 55

miles east (N. 84° E. mag.) from the south extremity of Jicarita, is a bold headland marking a sharp turn of the coast. It is the beginning of the range of high coast land which terminates at Morro Puercos.

“LANDFALL.—Mariato Point is a good landfall for vessels bound to Panama from the westward, as by keeping under the land to the eastward of the point they avoid the southerly set-out of the gulf.

“MORRO PUERCOS, 27 miles east of Mariato Point, is a lofty headland forming the termination of the range of high coast land. The water off this coast is deep close to the rocks for two-thirds of the distance, with 100 fathoms within 2 miles of the shore. Nearer Puercos Point the 20-fathom line is about 2 miles from shore. About 4 miles westward of the point and 1 mile from the shore is a reef above water; and 2 miles northeastward of the point, $1\frac{1}{4}$ miles from shore, is a 3-fathom patch. The chart shows a 5-fathom spot, with 14 fathoms close-to, at $3\frac{1}{4}$ miles S. 75° E. (S. 81° E. mag.) from the point.

“COAST.—From Puercos Point to Guanico Point, 7 miles to the northeastward, the coast curves in a double bight, and thence in a larger bight to Raia Point, off which, at one-half of a mile, are the Venado Islet and reef. The Tomosi River is nearly 3 miles northward of Guanico Point, and about the same distance beyond the river, at the head of the bight, is a patch of rocks at a short distance from the shore. About 2 miles westward of Raia Point is the Juera River, mentioned in Findlay as accessible, according to native report, for vessels of any draft, having 10 or 12 fathoms depth, and affording a supply of fresh water.

“From Guanico Point to Cape Mala, 23 miles N. 66° E. of the point, the coast is low and along it the depths are moderate.

“NORTH AND SOUTH FRAILES are two low, barren, flat topped islets, of which the southern lies $11\frac{3}{4}$ miles S. 46° W. (S. 40° W. mag.) from Cape Mala, and the northern $2\frac{1}{4}$ miles N. 28° W. (N. 34° W. mag.) from the southern. A reef extends about 200 yards off the northwest point of the southern islet, but with this exception they are steep-to and clear of outlying dangers, with 20 to 30 fathoms within one-half of a mile of the rocks. Although a good mark for Cape Mala in clear weather, at night or in the thick, squally weather of this coast they are dangerous to vessels keeping under the land

westward of Mala to avoid the current, as the lead gives no warning of their proximity. At such times they should be given a wide berth.

THE GULF AND BAY OF PANAMA—PEARL ISLANDS.

Variation in 1902.

Cape Mala 5° 41' E. | Piñas Point..... 4° 58 E.

“GENERAL DESCRIPTION.—Cape Mala on the west and Piñas Point on the east may be considered the limits of the Gulf of Panama. The line between these points, running nearly east and west, is 105 miles long, and within this line the gulf extends to the northward 92 miles, with the bay and city of Panama at its head. Between the entrance points the 100-fathom line curves slightly to the northward, the depths outside increasing rapidly to 1,000 and 2,000 fathoms, while within they decrease gradually to the head. The Pearl islands are entirely within the 50-fathom line.

“The Isthmus of Panama, which encircles the gulf, is the narrow neck of land connecting the continents of North and South America; in a restricted sense the name is applied to the narrow crossing between Panama and Colon, the two other narrowest crossings being distinguished as the Isthmus of San Blas and the Isthmus of Darien; the widths of the Isthmus at these points, in the order here given, are, respectively, 31, 27, and 32 miles, the last distance being measured from the head of deep-water navigation at the mouth of the Savannah River in Darien Harbor.

“The whole Isthmus is comprised in the Department of Panama of the Republic of Colombia, this department extending from the Costa Rican boundary to the Department of Cauca. All the departments of Colombia, except Panama, are included in South America. The total population of Panama in 1881 was 285,000 persons.

“CLIMATE.—The geographical position of the Isthmus of Panama, the absence of high mountains, and the vast extent of forests and other uncultivated parts tend to produce a hot and rainy climate, which, nevertheless, with the exception of a few localities, as Chagres, Colon, and Portobelo, is said to be healthy and more favorable to Europeans than that of most tropical countries. Diseases of the digestive and integumentary systems are common, and malarial fevers, often of a most pernicious type, prevail throughout the year. The rainy

season is the most unhealthy, especially at its end, when the weather is changing. Yellow fever has prevailed at times in an epidemic form. On board ship Panama is the most healthy place on the coast of Central America. Vessels of war have remained here many months at a time, their crews continuing in a healthy state

“The wet season begins in May and lasts till November. The rains gradually increase until the season is fairly established in June, and continue through July, August, and September, with strong southerly winds. In December the rains cease; the NW. and NNW. winds set in, producing an immediate change. During the dry season regular land and sea breezes blow. The sea breeze sets in about 10.30 a. m. from SSW., generally increases in force until about 3.30 p. m., then gradually subsides, and at sunset is followed by a calm.

“About the end of June the rains are suspended for a short time, the occurrence of this phenomenon being so regular as to receive the name of *Veranito de San Juan*. The average temperature of the year is very high.

“WINDS.—The navigation of the approaches to the Gulf of Panama is for a sailing vessel one of the most tedious, uncertain, and vexatious undertakings known to the seaman. Between Cape Corrientes (latitude $5^{\circ} 30' N.$) and Panama the prevalent winds are from the northward and westward, with frequent squalls from the SW. between the months of June and December. In the Gulf of Panama the winds are regulated by the seasons; the prevalent wind, however, is from the northward. In the fine season, commencing in December, the winds are regular and constant, bringing fine, dry weather. To the southward of the gulf they blow much harder, and off the coast of Veragua^a a double-reef topsail breeze in January and February is not uncommon. In April and May the northerly winds are less regular and have more westings in them, with calms, light sea and land breezes, and occasional squalls from the southwestward. In June the rainy season sets in and the southerly winds become stronger; still the northwest wind is mostly found after noon, and vessels sailing from Panama will generally have at all seasons a fair wind until south of Cape Mala.

“Between the Galapagos Islands and the coast, westward

^aProvince of the Department of Panama lying between the Isthmus of Panama and the Isthmus of Chiriqui.

of the meridian of 80° W. and south of the parallel of 5° N., the winds are between south and west all the year round, and, except between the months of February and June, they are of sufficient strength and duration to make navigation easy; but northward of latitude 5° N. and between 80° W. and 110° W. is a region of calms and doldrums, accompanied by rains and squalls.

“CURRENTS.—The Gulf of Panama is subject to irregular currents, partly caused by the formation of the land and partly influenced by the Peruvian and Mexican streams, according to the varying strength of each. Malpelo Island, which lies about 230 miles S. 25° W. of Cape Mala, is surrounded by strong and rapid currents. These have been observed to set in opposite directions, sometimes to the NE. and sometimes to the SW. A steady current has been found to set to the northward after passing Cape San Lorenzo, at the rate of 24 to 36 miles per day, extending offshore about 60 miles. This stream runs along the coast, following the direction of the land, enters and makes a complete circuit of the Gulf and the Bay of Panama, and then sets with considerable force, especially in the dry season, to the southward down the western side of the gulf. After passing Cape Mala it meets the Mexican current from the WNW., causing tide rips, eddies, and the short, choppy sea met with at the entrance to the gulf.

“WEST COAST.—CAPE MALA, which forms the western point of entrance to the Gulf of Panama, is a low but cliffy point with outlying rocky ledges, having deep water close to them. The land from the NW. slopes gradually down to the sea at this point from a considerable distance, making the exact cape difficult to distinguish unless the breakers are seen. On opening the gulf around this cape a strong southerly set is generally experienced, especially in the dry season.

“IGUANA ISLAND, lying about 9 miles to the northward of Cape Mala, is a little higher than the adjacent coast, and thus forms a conspicuous object. A ledge extends about 600 yards from its south point, and the chart indicates a reef as extending about 2 miles ENE. from its east point; also, in 1858, a reef was reported to stretch to the NNE. from its north point; but otherwise the island is steep-to, with 15 fathoms in the channel of about 1 mile in width between it and the main.

“TIDES.—High water, full and change, at Iguana Island is at 4h.; springs rise 15 feet. The flood sets to the northward

and the ebb to the southeast, the latter being considerably the stronger, especially between the months of December and June.

“PARITA BAY, nearly 20 miles wide and open to the eastward, lies within Lisa and Antoine points, the former point being 38 miles NW. of Cape Mala and the latter 40 miles SW. of Chamé Point. From the cape to Lisa Point the shore is a hard bank with sandy beach in front; at the point mud flats begin and extend around the western side of the bay, the coast being a low mangrove shore, intersected by the mouths of no less than five small rivers; the land to the westward is also low, with several hummocks. The coast between the bay and Chamé Point is a continuous beach, named Playa Grande, in front of a low wooded bank. There is a depth of 4 and 5 fathoms about 2 miles off this beach, except S. 22° E. (S. 27° E. mag.) of the Cerro Chamé, where there is only about 4 fathoms at nearly 7 miles from the land, the bank extending from here to Chamé Point.

“OTOQUE AND BONA ISLANDS, with Estiva Islet and Redondo Rock, lying 6 miles southeastward of Chamé Point, form a group similar but smaller than Taboga and Taboguilla, being cultivated and having a considerable village, named La Goleta, in the bay on the western side of Otoque. Otoque and Bona are high and peaked, and form good landmarks for vessels entering this side of the bay. Anchorage in from 10 to 14 fathoms may be found in any part of the group, and all dangers are above water.

“CHAMÉ BAY, at the head of which is a small river of the same name, is nearly filled with large mud banks, the largest, the Cabra Loma, lying in the middle of the bay and on it Tabor Island. Chamé Point, the southern horn of the bay, is a singular, low, woody, projecting peninsula, $5\frac{1}{2}$ miles long and one-half mile wide; between it and Cabra Loma Bank is a convenient harbor, 2 miles long by three-fourths mile wide, with from 3 to 8 fathoms water, there being 16 to 18 feet close to the beach.

“COAST.—The coast from Chamé Point to Bruja Point, a distance of 16 miles, forms a shoal bay, with several outlying banks and rocky islets, and vessels bound to Panama should therefore keep near the Island of Taboga and not approach this shore within the depth of 5 fathoms. The Rio Chorrera discharges at the head of the bay, about 15 miles southwest-

ward of Panama, and on the river, at about 17 miles from Panama, is the town of Chorrera, 180 feet above the sea, with nearly 5,000 inhabitants. Vique Cove, with a small village is 5 miles westward from Bruja Point. About a mile north-east of Vique is a lofty treble-peaked hill, 1,610 feet high, named Cerro de Cabra, a conspicuous object for vessels bound to Panama, and frequently mistaken for Taboga by those coming from the eastward.

“VALLADOLID ROCK, with 10 fathoms close-to, lies 6 miles north of Otoque Island and $6\frac{1}{2}$ miles northeast of Chamé Point.

“CHAMÉ ISLAND lies 2 miles northeast of Valladolid Rock, with 7 to 10 fathoms close outside. Perique Rock lies close to the north extreme of the island.

“TABOGA ISLAND, with the islands of Urava and Taboguilla, forms a pleasant group, about 4 miles by 2 miles in extent, lying 9 miles south of Panama. Taboga, the highest and largest island, 935 feet high, is well cultivated, with a large village on its northeast side. Northward of the village is the Morro of Taboga, a small hill connected with the main island by a sandy neck covered at high water. This island is occupied by the Pacific Steam Navigation Company, which has here some stores, a water tank with abundant supply of water, and a gridiron 300 feet long.

“THE ANCHORAGE off the village is convenient, being about 600 yards from the shore, in 10 fathoms, with the peak of Urava in range with the high cliff of Taboga, and the church bearing between southwest and west.

“URAVA is a small lofty island separated from the southeast end of Taboga by a narrow and shoal channel; off its south extreme is the small islet of Terapa.

“TABOGUILLA, 710 feet high, also well cultivated, with some islets off its southwest extreme, is the northeast island of the group, with a wide and deep channel between it and Urava, and in the middle of the channel a rock which uncovers 4 feet at low-water springs; the sea seldom breaks over the rock at high water, and it must be carefully avoided by closing either island, both being steep-to, or by keeping the neck of the Morro open, bearing N. 57° W. (N. 62° W. mag.), and passing south of it. Farallon, a small islet, also lies in this channel and is steep-to, with 10 fathoms between it and Taboguilla.

“MELONES, a small rocky islet, lies $2\frac{1}{2}$ miles northwest of

Taboga, with the Melones rock, above water, one-half mile to the northward of it.

“BRUJA POINT, about 5 miles northward of Taboga Island, is a rocky, projecting point, marking a turn of the coast. Venado, Cocovi, and Cocoviceta islets lie southwestward of the point, all within a distance of $1\frac{1}{2}$ miles; and Tortola and Tortolita islets lie about 2 miles southeastward of the point and $3\frac{1}{2}$ miles north of Taboga; these islets are all within the 3-fathom curve. From Bruja Point to the City of Panama shoal water extends about 2 miles from the shore and envelopes all the islands on this side of Panama road.

“BATELE POINT, $1\frac{1}{8}$ miles northeast of Bruja, is the south extreme, 102 feet high, of a large, round, hilly projection which forms the western side of Panama road. Changarmi Island, surrounded by the Pulperia Reefs, with Penamarca Rock at their northern end, lies $1\frac{1}{8}$ miles S. 68° E. from the point.

“GUINEA POINT, $1\frac{1}{2}$ miles northward of Batele Point, is the north extreme, 320 feet high, of the hilly projection above mentioned. From here to the city of Panama, $2\frac{1}{2}$ miles to the northeastward, the shore line recedes in an extensive bight, filled with mud flats, and is broken by the mouths of the Farfan, the San Juan, and the Grande, small rivers with cultivated banks. La Boca, at the mouth of the Rio Grande and about $1\frac{1}{2}$ miles west of the city, is the railway terminus, where connection with ship is made.

“NAOS, CULEBRA, PERICO, AND FLAMENCO ISLANDS, with the outlying islet of San José, are a group in the southwestern part of Panama road, Perico, 335 feet high, lying about 6 miles northward of the north extreme of Taboguilla and 2 miles southward of the city. Naos, 167 feet high, is connected with Culebra and Perico by a neck of sand and rocks, covered at high water. The passage between Perico and Flamenco is shoal and should not be used except by boats, but that between Flamenco and San José has 5 fathoms in mid-channel and no dangers. Flamenco is 344 feet high.

“Naos is the headquarters of the Pacific Mail Steamship Company, which has here machine shops, and a depot for fresh water, coal, and supplies, which articles can be obtained from the company. The bay on the northern side of Naos and Perico forms a convenient anchorage, and on the isthmus connecting the two islands, which is sandy on the

north side, steam vessels of 2,500 tons have been easily beached. A channel has been cut by the tides around the eastern end of Naos Island, through which the anchorage north of the island may be reached with a draft of 20 feet at mean low water.

“LA BOCA CHANNEL has been dredged across the flats that fill the bight southward of the city, so as to connect the anchorage northward of Perico Island with the Panama Railroad terminus at La Boca, on the east side of the mouth of the Rio Grande, this being also the terminus of the Panama Canal. A large iron pier for vessels has been constructed at La Boca, and in the basin adjoining it the depth at mean low water was stated by the Panama Railroad Company in June, 1901, to be nowhere less than 29 feet. The channel is well marked by ten pairs of buoys, and five additional buoys mark the west side of the basin opposite the pier. These buoys, while intended to be, respectively, red and black, show with the color of rusty iron. The railroad company possesses and maintains in readiness for use an extensive dredging plant for the purpose of keeping this channel deep enough for ocean steamers.

“PANAMA—LA BOCA CHANNEL—DREDGING OPERATIONS.—Information dated May 21, 1902, has been received from the Panama Railroad Company that the work of dredging the seaward end of La Boca Channel is progressing rapidly, establishing a depth of 21 feet at low water spring tides. The work will be continued until approximately that depth is established in the channel up to the pier and basins, at which a much greater depth is maintained.

“LA BOCA WHARF^a was built by the canal company, but has been turned over to the railroad company. During its construction its failure was predicted on account of the great rise and fall of the tide and the difficulty of keeping open the channel leading to the wharf, as a great amount of mud is brought down by the San Juan River. The difficulties have been reduced to a minimum. Vessels are not lashed alongside the wharf, but have floats placed between them and the wharf, so that there are no bad results from the tide. The cranes or winches on the wharf are of a special kind that permits the working of cargo at all stages of the tide.

^aReport of vice-consul-general, June 15, 1901.

“The following measurements give, in feet, the size and capacity of the wharf: Total length, 985; total width, 54; depth of channel alongside at high tide, $45\frac{5}{8}$; at low tide, $26\frac{1}{4}$; width of channel alongside, 98; capacity of vessel space, 985; railroad tracks, 2; total length of railroad track, $787\frac{1}{2}$; car capacity of tracks, 39; cranes, 6 of 2 tons and 1 of 20 to 24 tons; tonnage of largest vessel yet docked, 4,600 tons.

“The basin in which vessels lie has a maneuvering space of 486 feet. The bottom is soft mud, and while it is considered best for the vessels to be at all times afloat, yet they can rest safely in the muddy bottom.

“From the above it is seen that any vessel of 500 feet length and not drawing more than 26 feet can be handled at this wharf with facility.

“The wharf is constructed entirely of steel, and is roofed over and housed in with corrugated iron. The rates charged for vessels coming alongside are governed for the most part by contract.

“LOS HERMANOS ROCKS are three black rocks, visible at first-quarter ebb, lying nearly one-half mile south of the southeast bastion and 300 yards from the reef; detached rocks with 3 and 7 feet of water between them, visible only at low-water springs, lie off their southeast extreme, the outer one being 400 yards from the reef.

“BUEY POINT, seen only at half tide, is the northeastern extremity of the rocky ledge or reef that surrounds the eastern and southern shores of the peninsula occupied by the city, with a width of from 500 to 1,000 yards. Immediately south of Buey Point, which lies 900 yards eastward of the northeast bastion, a deep indentation in the reef forms a bay in which, after half flood, there is easy landing on the sandy beach in front of the Monks' Gate. The reef is marked by iron posts.

“PETILLO POINT, $1\frac{1}{4}$ miles northeastward of the city, is a black rocky promontory with two small hills over it, and between them a rivulet admitting boats at high water; rocky ledges extend 300 yards from the point. Between Petillo Point and Buey Point the shore recedes nearly three-fourths mile, forming a bay called El Puerto, the head of which is of mud, edged with a sandy beach, and the greater portion dry at low-water springs. It is here that most of the minor trade of the gulf is carried on by means of bungos (large canoes

made from trunks of trees, some of them, though, made of a single trunk measuring 12 tons). Though clumsy in appearance, they are well fitted for the navigation of the gulf, and bring to the city most of the tropical productions of the Isthmus.

“THE KNOCKER AND TABOGA are two rocks with only 6 feet of water on them, the former nearly five-eighths mile S. 86° E. (N. 89° E. mag.) from the southeast bastion, and Taboga about 300 yards southwestward of the Knocker. A stranger should not attempt to pass west of the red buoy marking the Knocker, this being in 14 feet about 300 yards eastward of the rock, which has near it depths of 8 to 12 feet. Shoal patches with 10 and 11 feet lie outside the buoy at from 400 to 800 yards from the Knocker.

“SULPHUR ROCKS.—This dangerous reef, lying about a mile northwest of the Danaide and $1\frac{1}{2}$ miles eastward of the southeast bastion, is about one-fourth mile in extent, north and south, and has a rock awash in its center, with 6 and 9 feet around it, and outlying patches of 12 and 14 feet. The reef is marked by a red buoy on the southern side. The railroad flagstaff, in line with the center of Mount Ancon, bearing N. 89° W. (S. 86° W. mag.), leads northward of the reef in 15 feet, but this passage should not be used at low-water springs.

“DANAIDE ROCKS.—These four patches of conical rocks, lying on the eastern side of the Panama Road, about $2\frac{1}{4}$ miles northeastward of Perico Island and $2\frac{1}{2}$ miles southeastward of the city, have only 15 to 18 feet on them, with $3\frac{1}{2}$ and 4 fathoms on all sides. They lie awkwardly in the track of vessels standing for the anchorage from the eastward and keeping their luff with the land breeze. These shoal spots are favorite fishing places, and canoes seen in their vicinity should be avoided by vessels, as they may be fishing on the rocks.

“CLEARING MARKS.—The south steeple of the cathedral kept midway between the east and southeast bastions, N. 61° W. (N. 66° W. mag.), leads southward of all the Danaide patches; the Hermanos rocks in range with the hill, 252 feet high, between the rivers Farfan and Grande, S. 84° W. (S. 79° W. mag.), leads to the northward of the patches and southward of Sulphur rocks.

“PANAMA ROAD, the anchorage off the city of Panama, al-

though shoal and on the seaward side entirely unprotected, may be considered secure. The bottom, being of mud, holds well, and with good ground tackle and common precaution a vessel might lie here with one anchor down all the year round. Attention to the tides and soundings will enable a vessel to lie close-in at times for discharge of cargo. The new dredged channel leading to the railroad terminus at La Boca enables vessels to discharge and load at the pier.

"The inner anchorage is in 2 fathoms about a mile eastward of the northeast bastion; the outer anchorage is in $3\frac{1}{2}$ to 4 fathoms about 2 miles southeastward of the city, or in 5 to 6 fathoms northeastward of Perico Island.

"LIGHTS.—A fixed red light, visible 3 miles, is shown at the end of the railroad wharf north of the city.

"A fixed red electric light, maintained by the city to illuminate the promenade, is shown at an elevation of 64 feet above low-water mark from a pole standing 100 feet north of the corner of the southeast bastion, and is the highest electric light seen from the bay. This light is made on rounding Taboguilla, being then, in ordinary weather, distinctly visible, and is used as a leading light by the Pacific Mail steamers, giving them at night the direction of San José Rock by shutting the light out behind the rock.

"TIDES.—High water in Panama Road, corrected establishment, is at 3h. 2m.; low water at 9h. 12m.; mean range of tides, 13 feet; of springs, 17 feet; of neaps, 8 feet. The average times of high and low water are a trifle earlier at La Boca and the range of the tide somewhat greater, the mean range of spring tides being 20 feet.

"The datum plane for the *Ranger's* survey of the harbor of Panama in February and March, 1900, is mean low water as determined by the Panama Canal Company's observations, extending over a period of five years, at its tide-gage station at the northeast end of Naos Island.

"TIDAL STREAMS.—The flood stream sets to the northward and the ebb stream to the southward, the strength varying from one-half knot to $1\frac{1}{2}$ knots per hour, the ebb being stronger than the flood. The long swell which occasionally sets into the road ceases with the flowing tide.

Tidal streams in Panama Harbor, as observed by the U. S. S. Ranger in February and March, 1900.

Station.	Half flood.			Half ebb.		
	Range of tide in feet.	Set.	Drift in knots per hour.	Range of tide in feet.	Set.	Drift in knots per hour.
Eastward of Perico and Flamenco islands.	21	NW. $\frac{1}{2}$ N.	0.6	20	SE. by S.	0.6
Knocker buoy.....	17	NW.	.5	16	S. by E.	.6
Entrance to La Boca Channel.	17	W. by N.	.4	21	S. by E.	.7
Halfway up La Boca Channel.	17	WNW.	1	21	SE. by E. $\frac{1}{2}$ E.	2.2
La Boca basin, halfway between pier and inner-channel buoys.	17	W. by N.	1	20	SE. $\frac{1}{2}$ E.	1.5

"PANAMA CITY, the capital of the Department of Panama, with a population estimated in 1901 at 20,000, of which the foreign element, mostly Jamaican negroes, forms about one-half, the Americans numbering about 100, stands on a rocky peninsula jutting out into the shallow water at the head of the bay, and was formerly a strongly fortified city. It has a noble appearance from the sea; the churches, towers, and houses, showing above the line of the fortifications, stand out from the dark hills inland with an air of grandeur. About a mile westward of the city, to which it forms a pleasant background, is Mount Ancon, a beautiful hill, 630 feet high. On each side of Ancon are flat hills, with copses of wood and savannas, grassy slopes, and wild thickets, while to the southward the cultivated islets of Perico and Flamenco complete a scene which, says Dampier, makes 'one of the finest objects that I ever did see, in America, especially.'

"The expectations formed in viewing the city from the sea are by no means realized on landing. The principal streets extend across the peninsula and are intersected by the Calle Real running east and west, which has a quiet and stately but comfortless air. The houses are of stone, mostly in the old Spanish style, the larger ones with courts and patios. The public edifices, comprising cathedral, churches, convents, nunnery, college, theater, and market, are partly in ruins. The cathedral, a large lofty building on the west side of the plaza, is hardly worthy of its situation, only the towers redeeming it from insignificance and forming in the distance an ornament to the city. The fortifications were well con-

structed, but are in partial ruins, the northeast bastion having fallen in 1845. The south and west ramparts are in fair condition and form a pleasant promenade. Drainage is neglected, though the elevation of the peninsula on which the city stands, together with the great rise and fall of the tide, offers considerable advantages for cleansing, a duty at present performed by the heavy rains of the wet season. In 1901 the police force of the city, numbering 150, was reported as efficient, well uniformed, and well armed. The city was under martial law.

“THE OLD CITY of Panama, built in 1518, which was taken and destroyed by the buccaneers under Morgan in 1673, stood at the mouth of a creek, about 4 miles northeast of the present city. Old Panama was larger than the Panama of this day and a place of surprising wealth. The spot is now deserted, but well marked by a tower, an arch, two or three piers of a bridge, and some fragments of wall. In the afternoon the tower is still a conspicuous object from the anchorage.

“WEATHER.—The following brief synopsis of the weather at Panama is by Mr. J. H. Smith, long a resident of the city:

“JANUARY, FEBRUARY, AND MARCH.—Fresh north winds, fine weather, and clear sky.

“APRIL.—North winds decreasing, with frequent calms and light southerly airs in the day; latter end of month, occasional squalls from the north in the afternoon, with rain, thunder, and lightning.

“MAY.—During the day frequent calms and light southerly winds, weather becoming cloudy, and occasional fresh squalls from northeast to southeast, with rain.

“JUNE.—The rainy season well set in, breezes during the day increasing from the south, with squalls and heavy rain; nights generally clear, with light land breezes from the north; latter end of month eight or ten days of fine weather frequently occur.

“JULY, AUGUST, AND SEPTEMBER.—Moderate south winds, squalls, and rain; during the equinox four to six days of strong south winds without cessation during the night, and frequent squalls with rain.

“OCTOBER.—South winds, squalls, and rain; frequent land winds at night and fine west winds.

“NOVEMBER.—South winds decreasing, with frequent intervals of fine weather and occasional squalls off the land.

“DECEMBER.—First part, frequent calms and light south winds during the day; latter part, occasional north winds and fine weather.

“SANITARY CONDITIONS.—The habits of the people are in general most uncleanly and the sanitary condition is bad. Yellow fever, remittent, bilious, and pernicious fevers are endemic, and yellow fever was considered epidemic in July, 1885. No reliable information can be obtained as to the mortality of the port; it has been reported as high as 40 per diem during the sickly season. The most sickly parts of the year are at the changes of the seasons. It is considered that the prevailing direction of the wind has some influence on the sanitary state—that the northwest winds are healthful and the southeast winds unhealthful. During the wet season calms and light variable winds prevail, the air is laden with moisture, and it is very oppressive. At the canal company's observatory on Naos Island the highest temperature was 102° F. and the lowest 66° F.

“HOSPITALS.—The foreign hospital, built and owned by the canal company, situated on high ground at the foot of Mount Ancon, is well managed and clean, with a capacity of about 2,000. The cost of occupation is \$2 and \$5 per day for a separate room. Two regular physicians are in attendance. A sanitarium on Taboga Island is connected with the hospital.

“The St. Thomas Hospital, a charity institution, situated in the city and subsidized by the Government, is dirty and not well kept. The capacity is about 100 and cost of occupation \$1 per day.

“SUPPLIES.—Supplies may be had, but it is considered unsafe to buy them on account of the bad sanitary condition of the place and the consequent danger of infection. Lighters for the transportation of stores may be hired from the railway company. Fresh provisions in ample quantity and of fair quality can be purchased as required. Prices paid by the U. S. S. *Iowa* in October, 1901: Fresh beef, 12½ cents; vegetables, 8 cents; bread, 8 cents. All kinds of fruit are obtainable. Ice can be obtained in large quantities. Sand is obtained from Perico Island. Good water can be obtained from the Pacific Mail Steamship Company at Flamenco Island or from the Pacific Steam Navigation Company at Taboga Island, being brought alongside and pumped into the tanks by steam pumps at a cost of 2 cents per gallon. The

Iowa was supplied by the Panama Railroad Company, by steam water boat, capacity 50,000 gallons, at 0.9 cent per gallon.

“COALING FACILITIES.—Cumberland, Cardiff, Welsh, New Castle, and Australian coal can be obtained from the Panama Railroad Company, the Pacific Mail Steamship Company, and the Pacific Steam Navigation Company, which companies keep large quantities on hand, though it is said that the steamship companies will not part with any coal when it can be purchased elsewhere. The coal is delivered alongside in lighters holding from 150 to 250 tons, at a cost per ton of from \$13 to \$17. Coal may be obtained directly from the ship or collier, which greatly lessens the danger of fever. The *Iowa* was supplied by the Panama Railroad Company with 100 tons per week of Pocahontas coal, at \$9.50 gold per ton; supply reported as plentiful.

“TELEGRAPH AND POSTAL COMMUNICATION.—Panama is connected by cable with South American and Central American ports, and by land line with Colon, and thence by cable with Jamaica and the West Indies. The line to the United States and Europe is by way of the Tehuantepec Isthmus, the City of Mexico, and Galveston, Tex. Postal communication with the United States is by the Panama Railroad Company's steamers from Colon; with Central America, Mexico, and San Francisco by the Pacific Mail and other steamers, and with South American ports by the steamers of the Pacific Steam Navigation Company and the South American Steamship Company. Mails from the United States are at times irregular.

“STEAMER LINES.—Panama is a terminal point or port of call of four lines of steamers, viz:

“(1) The Pacific Mail line to San Francisco, three times a month, calling at Central American and Mexican ports.

“(2) The Panama Railroad Steamship line to San Francisco direct.

“(3) The Pacific Steam Navigation Company's line from Coronel, Valparaiso, and intermediate ports to San Francisco and intermediate ports; also line of this company from South American ports to Acapulco and way ports; and line from South American ports to Ocos and way ports.

“(4) The Compañía Sud-Americana de Vapores Line, with the same itinerary and alternating in service with the pre-

ceding company, Lota (Chile) being the extreme southern point, however, instead of Coronel.

“The rate for first-class passengers from New York to San Francisco is \$105, and from New York to Valparaiso \$240.

“COMMERCE.—The commerce and trade of Panama is naturally divided into two parts, the local and the transit. The latter is also divided into two parts, that with the United States and that with Europe. The entire local trade of Panama with the United States for the year 1885 amounted to \$3,728,961 of exports and \$4,263,519 of imports.

“The local exports are india rubber (which is becoming scarcer), gold dust, hides, ivory nuts, manganese, shells, tobacco, cocobolo (a cabinet wood), tortoise shells, vanilla, whale oil, sarsaparilla, cocoanuts, and fruit. From South America the bulk of the shipments consists of bark, cotton, cocoa, and rubber; from the Central American States, of coffee, sugar, and indigo.

“Panama is normally a free port, but import duties are levied on tobacco in all its forms, salted or preserved meats, wines, spirits, ales, beer, ginger beer, cider, salt, etc. Recent reports state that there is a customs duty of 15 per cent on all goods, with an increase on spirits.

“IN SHIPPING STORES for naval vessels on the coast to the care of the consul-general at Panama it is absolutely necessary that they should be accompanied by complete invoices stating the contents of each package, the weight thereof, and the cost value. Small parcels must also be accompanied by a statement of contents and value addressed to the consul-general or to the person to whose care they are consigned.

“MACHINE SHOPS.—The Pacific Mail Company has a small machine shop on Naos Island for repairing vessels of the line, and the Pacific Steam Navigation Company has a similar one at Taboga Island. There are no docks at Panama; the grid-iron at Taboga is the only means of effecting repairs to vessels' hulls.

“LANDING PLACE.—The general landing place at high water is around Buey Point inside the northeast bastion, at the market place known as ‘the steps.’ Great care is required when landing at Panama in steam cutters or other heavy boats, which can be effected only at nearly high water. Landing is made in small boats from ships' boats at Hotel Marina landing. Boats going in should pass southward of the outer

white beacon and leave all the other beacons on the port hand.

"THE PANAMA RAILROAD, 47 statute miles long, extending to Colon, on the Atlantic side of the Isthmus, is an asset of the bankrupt Panama Canal Company, which holds nearly all of the stock. Culebra, the station at the highest point of the road, is probably, with the exception of the Nicaragua divide, the lowest point in the range of mountains that extends from North America all the way through South America, being 252.4 feet above mean sea level.

"The road, which was built by an American company between 1850 and 1855, is a broad-gage, single-track line, with a maximum grade of 76.6 feet to the mile. The rate for first-class passengers between Panama and Colon, formerly \$25, is now \$4 in American gold.

"At Colon connection is made for ports of the Spanish Main, the West Indies, and all parts of Europe by steamers of the Royal Mail Steam Packet Company, Leyland Line, Harrison Line, Compagnie Generale Transatlantique, Hamburg-American Packet Company, La Veloce (Italian), and Compañia Transatlantica Española. The steamers of the Panama Railroad Steamship line leave Colon for New York every Tuesday; time seven days.

"THE PANAMA SHIP CANAL, to connect the Atlantic and Pacific oceans, is planned to follow much the same route as that of the railway from Colon to Panama, the length to be 49.09 statute miles from the 6-fathom line in the harbor of Colon to the 8-fathom line in Panama road, and the depth 35 feet, with a minimum bottom width of 150 feet, as planned for the Nicaragua route. The special difficulties to be encountered are the deep cut of the summit level at Culebra and the Bohio Dam for the impounding and control of the waters of the Chagres River and its tributaries. The summit level of the canal, that of Lake Bohio, this level being carried completely through the Culebra Cut, will be nearly 22 miles in length and in general 85 feet above mean sea level, with extreme fluctuation between 82 and 92 feet. It will be reached by two locks on the Atlantic side, both at the Bohio Dam, and by three locks on the Pacific side, two at Pedro Miguel and one at Miraflores, the latter point being 1.33 miles nearer Panama. The cost of construction to complete the canal on these lines, taking advantage of the work already done, is

estimated by the Isthmian Canal Commission at about \$145,000,000.

“The natural attractions of the Panama route lie in the combination of a very narrow isthmus with a low summit. The width of the Isthmus in a straight line is less than 35 statute miles, while the summit is barely 300 feet above mean tide, which, though higher than the Nicaragua summit, is less than half the height of any other that has been investigated. The high portion of the Isthmus is limited to a width of about 6 miles near the Pacific side, and the Chagres River affords access by canoe navigation to within 15 miles of the Pacific Ocean.

“CONSULS.—The United States is represented at Panama by a consul-general and a vice-consul-general, Great Britain and France by consuls, and many other countries by honorary consular officers.

“PORT OFFICIALS.—There is a captain of the port, who is also the health officer, but it appears that he does not board incoming vessels and quarantine is not very strictly enforced.^a The quarantine station is near Taboguilla Island. Pilots are not required except for La Boca channel, for which the pilot is furnished by the Panama Railroad Company.

“OFFICIAL CALLS.—The governor of the Department of Panama and the President of the Republic, when present, are the only native officials to be called on. A saluting battery has recently been established on shore and salutes are promptly returned.^a

“DIRECTIONS.—Sailing vessels bound to Panama, especially between December and June, should endeavor to get within 3 or 4 miles of Chepillo Island, which lies near the coast north of the Pearl Islands, and so have all the advantage of the northerly wind. From this position Ancon Hill, behind the city, will be seen and should be kept a little on the port bow, as the wind draws to the westward on approaching the city. Vessels drawing over 18 feet should pass south of the Danaide Rocks by keeping San José Rock open to the westward of Taboga Island until the cathedral towers are open to the northward of Ancon. Having passed the Danaide, the ship is fairly in the road and may anchor according to her draft. If not more than 18 feet, she may have Tortola just shut in by

^a Report from U. S. S. *Iowa*, September 9, 1901.

Naos, bearing S. 30° W. (S. 25° W. mag.), and San José open east of Taboguilla. Larger vessels, drawing 24 feet, may anchor northeastward of Perico, with Urava Peak in range with the east point of Flamenco bearing S. 6° W. (S. 1° W. mag.), taking care not to open Changarmi northward of Perico. If necessary to work up the road to an inshore berth, a vessel should tack on the western side just before Perico and Flamenco touch, and in standing to the eastward avoid closing San José with Taboga Island, or Tortola with Flamenco.

“Vessels drawing 14 feet may pass northward of Danaide and south of Sulphur Rock, with Hermanos Rocks on with the right side of the peak between the rivers Farfan and Grande; then San José Rock on with the peak of Taboguilla, bearing south (S. 5° E. mag.), leads between Sulphur Rocks and the Knocker to an anchorage north of the buoy, in 16 feet, keeping it between Perico and Flamenco, with Gabilan, a rocky peninsula west of the town, just shut in by the south-east bastion. During neap tides anchorage more to the northwest may be taken.

“COAST.—From Petillo Point to the Chepo River an extensive mud flat borders the coast the entire distance, fronted by a shoal bank, the edge of which lies from 3 to 5 miles from shore. Numerous small streams intersect the shore line. Vessels should not stand into less than 6 fathoms between Panama and Chepillo Island.

“CHEPO RIVER, which enters the Bay of Panama about 25 miles eastward of the city, comes from some distance in the interior, its source being far to the eastward, near the headwaters of the Savannah River. The entrance is to the westward of Chepillo Island, through a 10-foot channel about 600 yards wide. A small hill with a cliff under it on the eastern bank, steered for on a bearing N. 54° E. (N. 49° E. mag.), will lead through the deepest water.

“THE SAN BLAS CANAL ROUTE, much recommended by the narrowness of the Isthmus at this point (27 miles), was carefully examined in 1870 by Commander Selfridge, U. S. Navy. The route ascends the Chepo River 12 miles, and then the Mamoni, a tributary from the northward, to its source; thence it crosses the divide, with an elevation of 1,142 feet, and descends by the Mandinga River to the Gulf of San Blas. A tunnel of 10 miles would be required to connect cuts of 190 feet on either side of the divide. For the remaining 16 miles

the excavation would not exceed an average of 60 feet. The vast expenditure for so long a tunnel renders this route, otherwise so prepossessing, of questionable practicability.

“The most complete plan developed by the Isthmian Canal Commission for this route involves a tunnel at least 7 miles long, which, while considered not necessarily impracticable, would be very objectionable, and renders this line inferior to that of Panama or Nicaragua.

“TIDES.—High water, full and change, at the mouth of Chepo River is at 3 h. 40 m.; tides rise about 16 feet.

“CHEPILLO ISLAND, described by Dampier as the most pleasant island in Panama Bay, lying off the mouth of Chepo River about 24 miles eastward of Panama and 2 miles from the coast, is 1 mile long by one-half mile broad, and very fertile. It is low on the north side, and rises by a gentle ascent toward the south end, over which is a remarkable tree that forms an excellent mark to vessels bound up the bay. The south end may be approached within a mile, but the other sides are shoal, and a reef extends three-fourths mile off the north point, following the direction of the channel.

“PELADO ISLET, lying $31\frac{1}{2}$ miles southeastward of Chepillo Island and 4 miles west of Mangué Islet, directly off the mouth of Chiman River, is flat, of small extent, about 60 feet high, and treeless, but covered with a coarse prickly shrub; it is steep to on all sides and forms a useful mark for vessels bound to Panama.

“THE COAST between Chepillo Island and Pelado Islet consists of low river land with mangrove bushes. Of the several small streams, the principal are the Hondo and Corutu, both being shoal at the entrance. The land north of these rivers is of some elevation; Column Peak and Asses' Ears, about 12 miles north of Chiman River, and Thumb Peak, at the west extreme of the range, are conspicuous. Extensive mud flats, dry at low water, extend from 1 to 4 miles from the coast, and outside of the flats is a shoal bank the outer edge of which lies 7 miles from the shore. Vessels standing in shore should tack in 9 fathoms.

“CHIMAN RIVER, 32 miles southeastward of Chepo River, is wide at the mouth, but shoal, being nearly dry at low water, with small channels for canoes. The entrance is well marked by the wooded bluffs on each side, the Mangué Islet to the southward, and Pelado Islet in the offing. On the eastern side,

under a hill, is the small village of Chiman. This is the point to which Pizarro retired in 1525 after beating about for seventy days, with much danger and incessant fatigue, without being able to make any advance to the southward. He was here joined by Almagro, and the following year they sailed again for Peru.

"MANGUE AND MAJAGUAY are high and wooded islets lying, respectively, 3 miles and 2 miles south of the east entrance point of Chiman River, and at the western edge of a large mud flat, dry at low water, which extends to the north bank of Trinidad River. There are 10 to 12 feet of water to the westward of the islets.

"TRINIDAD RIVER, about 9 miles southeastward of Chiman River, has a low rocky projection forming its southern point of entrance. A 3-fathom channel was found into this river, extending $1\frac{1}{2}$ miles from the point, beyond which distance it was not examined. The northern bank of the river is composed of mangroves, which continue along the coast from here to Panama, a distance of nearly 70 miles, except where interrupted by the bluffs of the rivers Chiman and Chepo. Shag Rock, a barren islet with shoal water around it, frequented by birds, lies $2\frac{1}{2}$ miles northward of the entrance.

"THE PAJAROS are two small rocky islets, lying between 2 and 3 miles south of the south entrance point of Trinidad River and $1\frac{1}{2}$ miles from the coast, with 4 and 5 fathoms off their west sides, but only 12 feet between them and the shore. From Chamé Point, southwest of Panama, to these islets, the whole shore of Panama Bay is fronted by a shoal with 5 fathoms on its outer edge.

"SOUTH FARALLON INGLES is a small but high island, lying about 8 miles southward of the Pajaros and 19 miles southeastward of Pelado Islet, at the edge of the shoal off the river Buenaventura, with 12 and 15 feet of water on its western side. North Farallon lies three-fourths mile to the northward and three-eighths mile from the west entrance point to the river. It was in this river, in 1681, that Dampier and his party, being prevented by the Spaniards from going by way of the Santa Maria or Chepo rivers, sank their ship when starting on their journey to the Atlantic; this they reached in twenty-three days at a point near Concepcion cays, 60 miles westward of Golden Island in Caledonia Bay, having traveled 110 miles and crossed some high mountains, though their

common march was in the valleys, among deep and dangerous rivers.

“GORDA POINT, 4 miles northward of the South Farallon, is bold and woody, with 4 fathoms close-to; above this point there is less swell than to the southward of it.

“BRAVA POINT and San Lorenzo Point, 2 miles to the eastward of Brava, lie on the north side of the entrance to San Miguel Bay; both are edged with reefs and outlying rocks on which the sea breaks with great violence, and this fact, together with the proximity of the Buey Bank, makes this part of the coast dangerous, and it should be avoided even by small vessels.

“BUEY BANK, lying about a mile south of Brava Point, in the northern part of the entrance to San Miguel Bay, is an extensive shoal about 3 miles in diameter, which dries in patches at low water and on which a heavy sea breaks. A passage five-eighths mile wide, with 4 to 5 fathoms, lies between the bank and the shore, but subject to a heavy swell and not recommended for use. A spit with 12 feet of water extends $1\frac{1}{2}$ miles off the southwest side of the bank, and outside the spit the water deepens very gradually, the 5-fathom line lying about 3 miles to the westward and 2 miles to the southward.

“SAN MIGUEL BAY, on the eastern side of the Gulf of Panama, is $15\frac{1}{2}$ miles wide between the entrance points, Brava on the north and Garachiné on the south, and penetrates within the points about 20 miles to the eastward. Between San Lorenzo Point and Patena Point to the southeastward, the bay narrows to about $7\frac{1}{2}$ miles, expands again within to 11 miles, and again narrows to $4\frac{1}{2}$ miles between Pierce and Virgin points; thence continues a curved and gradually narrowing channel, terminating in the land-locked and spacious Darien Harbor, formed by the junction of the rivers Savannah and Tuyra.

“Across the entrance of the bay and for about 9 miles seaward extends a flat bottom with depths from 5 to 8 fathoms, but the water gradually deepens within the bay, and through the Boca Grande the depths are from 11 to 16 fathoms. Across the entrance flat a depth of $7\frac{1}{2}$ fathoms can be carried, and thence to Darien Harbor more than 8 fathoms.

“San Miguel Bay was well known to the buccaneers, who used it as the entrance to the Pacific and terminus of their

overland journeys from the Gulf of Darien, which they generally accomplished in about ten days. Careful surveys were made in 1870 and 1871 by naval parties under Commander Selfridge, U. S. Navy, to ascertain the feasibility of a ship canal between this point and the Atlantic coast at Caledonia Bay and the Gulf of Darien, but the different routes across this part of the Isthmus were found to be quite impracticable. The route by way of the Atrato, the Napipi, and the Doguado rivers, considered by Commander Selfridge as the most practicable route eastward of Panama, terminates on the Pacific at Chiri-Chiri Bay, 112 miles below Garachiné Point.

"SAN LORENZO POINT lies 2 miles S. 76° E. from Brava Point, the shore between them receding in a shoal-water bight. A reef projects about 2 miles southeastward from the point, and on the reef at $1\frac{1}{4}$ miles from the point are the Paul Rocks, above water.

"From San Lorenzo Point the shore line turns sharply northward and sweeps around in a semicircular curve to Pierce Point, a rocky projection 7 miles to the northeastward, forming within these points North Bay, in which the depths are quite regular from $2\frac{3}{4}$ to 2 fathoms. A mud flat borders most of the shore and several streams enter the bay, among them being the rivers Congo and Cupunadi. In the western part of the bay is a shoal bank of triangular shape, about 3 miles on a side, with depths of one-half fathom, and on this bank are the islands Iguana and Iguanita and the Amelia islets and rocks. Lost Rock lies 2 miles north of San Lorenzo Point and one-fourth mile from shore.

"FROM PIERCE POINT a reef projects about three-fourths mile to the southward, with a rock above water near its outer end. McKinnon Bay, a small bight with shoal water at the head, lies eastward of the point and reef. Peris Point, 4 miles northeastward of Pierce Point, marks a sharp turn of the shore line to the northward at the beginning of the Boca Grande.

"GARACHINÉ POINT, the south entrance point of San Miguel Bay, is at the extremity of a peninsula projecting $5\frac{1}{2}$ miles northward from the mainland, with an average breadth of 2 miles. The land to the southward and eastward of the peninsula is lofty, Mount Zapo—noticeable as a sharp conical peak about 5 miles from the coast—rising to an elevation of 3,000 feet above the sea. A high, bold, and wooded coast apparently free from dangers and with deep water close-to, extends

southward about 30 miles to Piñas Bay. Cape Escarpado, with a small bight just above it, open to the northwestward, lies about 3 miles southward of the point.

“Garachiné Point is clean, and on its north and west sides may be closely skirted, but on the east side the line of 3 fathoms runs eastward from the extreme point.

“GARACHINÉ OR SOUTH BAY, lying within Garachiné Point and Patena Point, $11\frac{1}{4}$ miles to the northeastward, is shoal, with a low mangrove shore, from which mud banks extend to a distance of 3 miles. These flats are fronted by a shoal bank with 2 to 3 fathoms, occupying much of the remaining area of the bay. Several small streams enter the bay, and a channel with one-half fathom of water leads across the mud flat to the mouth of the River Sambu. Along the east side of the Garachiné Peninsula extends a tongue of water with a depth of $2\frac{1}{4}$ fathoms, forming a small harbor with anchorage for small vessels near Garachiné village, a small collection of huts at the head, where enters the River Alquitran.

“Vessels may anchor close-off either Garachiné or Patena points, the depth of water being convenient.

“PATENA POINT is low, sharp, and projecting, with Patenito Islet close outside and deep water near islet and point. Colorado Point, about $2\frac{3}{4}$ miles northeastward of Patena, is bold and rocky, with a conspicuous patch of reddish clay on its face; within the points the shore recedes about $1\frac{1}{2}$ miles, forming Charles Bay. From Colorada to Corales Point, $1\frac{3}{4}$ miles to the northeastward, the shore gradually gets lower, and from the latter point sweeps around to Virgin Point, forming a bay, with low mangrove shores, nearly 5 miles wide between the points; at the head is Corales village, about a mile southeast of the point, with anchorage off it at one-half mile; the shore of the bay is bordered by shoal water to the distance of three-eighths to three-fourths mile, outside of which are apparently no dangers.

“FROM VIRGIN POINT the shore line in its general trend turns gradually northward for nearly 5 miles to Virago Point, at the entrance of the Boca Chica; in this space are several little bays lined with mangrove, the points generally being of small elevation, rocky, and covered with bush. Bains Bluff, 1 mile southward of Virago Point, should be avoided on account of a ledge of rocks off it at 600 yards; the shore between the bluff and the point is also bordered by shoal water.

"CEDAR OR WASHINGTON ISLAND, $3\frac{1}{4}$ miles northeast of Corales Point and $1\frac{1}{2}$ miles west of Virgin Point, is about 600 yards long and wide and densely covered with wood. Several islets and rocks extend southward from it, and these, with the shoal extending from the opposite shore, take up much of the width of the channel on this side of the island. The best and most direct channel up the bay is northward of the island, and between it and Jones Islet, a conspicuous little rock about 20 feet high and covered with grass, lying $1\frac{1}{4}$ miles to the northwestward of Cedar, both being clean and safe of approach, with 10 fathoms in mid-channel.

"STRAIN ISLAND, $2\frac{1}{2}$ miles northeastward of Cedar and $1\frac{1}{4}$ miles from the eastern shore, is about 25 feet high and covered with trees and shrubs. It is surrounded by a ledge of rocks, extending a short distance off it toward the channel, and is connected by mud banks with two islands westward of it.

Between Strain Island and the western shore are Jorey Island, a chain of islets called Los Gombales, Edith Islet, and Mary Islet, all forming a group within the 5-fathom line, covering an area of 2 miles by $1\frac{1}{4}$ miles. Strain is the southeastermost of the group and nearest the channel.

"ANCHORAGE.—The space included between Cedar, Jones, and this group of islets appears to afford the most favorable anchorage for vessels not wishing to enter Darien Harbor, or obliged to wait for the tide in order to do so on account of the strong tidal currents and eddies in the entrances.

"BARRY ROCK, seven-eighths mile southwest of Strain Island and three-eighths mile north of Seaford Point, is 20 feet high, covered with cactuses, and surrounded by deep water; the channel is between the rock and the island, and has a depth of 10 fathoms.

"STANLEY ISLAND, low and wooded, $1\frac{1}{2}$ miles long by 1 mile wide, divides the channel into two passages, both leading into Darien Harbor; the principal one, the Boca Grande, forms a continuation of San Miguel Bay to the northward along the west and north sides of the island, while the Boca Chica skirts its south side, lying between the island and Virago Point.

"THE BOCA CHICA has on either side of its outer entrance a dangerous ledge of rocks, the passage between them being but about 200 yards wide; the southern ledge, called 'Colum-

bia Rocks,' projects about one-eighth mile westward from Virago Point and shows only at low-water spring tides; the Foley Rocks lie along the north side of the channel, extending nearly one-fourth mile westward from the south point of the island, and uncovering at half tide; north of this ledge is Trevan Islet. At three-eighths mile within the entrance the channel narrows to about 50 yards, the width between the shores being less than 200 yards. A small ledge makes out a short distance from Buena Vista, the southeast point of Stanley Island, having passed which the vessel will be in Darien Harbor, and may anchor, as convenient, in 5 to 10 fathoms, sand and mud.

"Although the Boca Chica carries a low-water depth of 5 fathoms, its use is not recommended, unless at slack water, for during the strength of the tide the velocity of the stream reaches 6 to 7 knots, and the eddies make steerage difficult.

"LEADING MARK.—The northwest extreme of Jorey Island and the middle of Mary Islet in line, S. 58° W. (S. 53° W. mag.), clears the rocks in the entrance of the Boca Chica. When past these rocks a vessel should keep in mid-channel, and when past the reef off Buenavista Point haul a little to the northward, to give Price Point a berth of 150 yards.

"THE BOCA GRANDE is a little over a mile wide at the entrance, between the rocks outside the Boca Chica and Milne Island, on the western shore, and continues for $1\frac{1}{2}$ miles at about the same width between Stanley Island and the shore. A dangerous rock, only showing at about three-fourths ebb and connected by a ledge with the island, lies off its northwest point, and from the opposite shore a shoal extends five-eighths of a mile, leaving between rock and shoal a width of five-eighths of a mile for the navigable channel; this now bends to the eastward and continues of the same width between Ray and Jeannette islands on the north, and a large, flat rock, nearly always uncovered, and a small wooded island, about a cable off Stanley, on the south; then bending southeastward it continues between Ellen and Paley islands on the west and the main shore on the east into Darien Harbor, gradually broadening after passing the former island and attaining a width of nearly 2 miles abreast of the Boca Chica.

"SAVANNAH POINT is the southern extremity of the long, low peninsula separating for a distance of 5 miles the Savannah River from the Boca Grande. Foul ground borders the

point, extending off one-fourth mile, and at that distance south of the point is a small islet with deep water close along its southern edge. Graham Point, one-half mile beyond Savannah, marks the entrance of the river, and has close off it the tiny islet La Pantila.

"VAGUILA ROCK, showing at about half tide, lies a little over one-half mile south of Savannah Point. There is a good channel three-eighths mile wide between the rock and the islet off the point, with 9 to 11 fathoms of water.

"DIRECTIONS.—To pass through the Boca Grande: After passing Barry Rock a vessel may haul up for the southwest end of Stanley Island, keeping on the range of Barry Rock and Virgin Point until Jones Islet comes in range with Strain Island; then steer to pass about one-fourth mile from Milne Island, and as soon as Mary Island is shut in by Milne steer for Ray Island, keeping the east end of Edith Island a little open of Milne; following the channel, pass Ray at one-fourth mile, and as soon as Ellen Island opens from Turk Island haul to the southward, giving these islands and then Paley Island a berth of one-fourth mile to starboard, and anchor, as convenient, in 5 to 10 fathoms; bottom, sand and mud.

"DARIEN HARBOR, formed by the junction of the Tuyra and Savannah rivers, extends in a southeasterly direction from the Boca Grande to the village of Chipigana, on the south bank of the Tuyra, a distance of 11 miles, with a width of 4 miles in the northern part and 2 miles at the village. The depth of water is from 7 to 10 fathoms from Paley Island to the mouth of the Savannah, beyond which it shoals rapidly, almost the entire harbor having a uniform depth of from 13 to 17 feet. Off Chipigana there is a depth of $3\frac{3}{4}$ fathoms for an area of about 1 mile by $1\frac{1}{2}$ miles, affording excellent anchorage for vessels not exceeding that draft, to which it is accessible by taking advantage of the tides. During spring tides, which here rise 22 feet, the currents both of ebb and flood run at this point with great velocity, and especially is this the case during freshets, when it is oftentimes difficult for a vessel to remain at anchor.

"The shores of the harbor are almost a continuous line of mangrove, intersected by numerous small streams, with densely wooded hills from 100 to 300 feet high a short distance inland. Chipigana is a town of about 600 inhabitants, mostly negroes, of which race almost the whole population of

Darien is composed. The houses are built of bamboo, and everything is of the most primitive description, a compromise between barbarism and civilization.

“LA PALMA VILLAGE, on the west shore, just at the inner entrance to the Boca Grande and at the beginning of the shoal water of the harbor, appears to be situated at the best point, and has an abundance of fresh water.

“ANCHORAGE.—The best place for anchorage is in 7 to 10 fathoms off Palma Village, about a mile southeastward of Price Point and 600 yards from shore.

“TIDES.—High water, full and change, in Darien Harbor is at 4h. 15m.; the mean rise and fall of tide is 16 feet. The tidal streams in the narrows are very strong, especially at the time of springs, which are said to rise 24 feet. Great care is required in the navigation, and it would seem advisable, at least for a stranger, to wait for slack water before attempting the passages.

“PRODUCTIONS.—All tropical productions of the Western Hemisphere can be grown here. Maize, rice, sugar, coffee, cocoa, yams, and plantains grow almost wild; mahogany can be had in abundance; also the palm and the india-rubber tree abound. This fine harbor, with its extensive rivers penetrating into the interior, in the hands of an energetic people that would cultivate the fertile soil of the region, would soon become a place of importance.

“CLIMATE.—There is a rainy and a dry season, the former beginning in May and lasting until November, accompanied by lightning and thunder and winds peculiar to the Gulf of Panama; for the other six months of the year the weather is fine. With common care, the country is comparatively healthy.

“TUYRA RIVER, the Santa Maria of the Spaniards and buccaneers, rises in latitude $7^{\circ} 40'$ N. and enters Darien Harbor near the village of Chipigana. About 26 miles above this village and a mile above the junction of the river Chucunaqua are the ruins of the old Spanish fort of Santa Maria, near which were the gold mines worked by the Spaniards in the seventeenth century. As far as Santa Maria, which is the head of navigation for all craft but canoes, the depths in the river are from 1 to 5 fathoms; above this point a steam launch drawing $3\frac{1}{2}$ feet could go only during spring tides.

“The spring tides extend during the dry season to some 3

miles above Pinogana, which is 48 miles by river above Chipigana, but at this point the flood does not run more than two hours, with an extreme rise of 4 feet. During the neap tides the rise barely reaches Pinogana, and during the rainy season the influence of the tide extends but half the distance, owing to the great amount of water to be backed up.

“By following the bends a depth of 30 feet can be carried 20 miles above Chipigana, except at the crossings, where there is but 22 feet at ordinary high tide. Above this point the channel of the Tuyra narrows considerably and the depth decreases. The country as far up as Pinogana is flat and marshy a long distance back from the river and is overflowed during high water in the autumn.

“THE CANAL ROUTE by way of the Tuyra ascends this river some 40 miles above Pinogana, and then the Cué, a tributary from the eastward, to its source; thence it crosses the divide at an altitude of 753 feet above the sea and descends the Cacarica or the Peranchita to a junction with the Atrato, and then this magnificent, deep, and navigable river, some 40 miles, to the Gulf of Darien. The difficulties of this canal line of 55 miles, with its necessary tunnel of 2 miles, are such as to make it quite impracticable.

“CHUCUNAQUA RIVER, which joins the Tuyra from the north at a point 25 miles above Chipigana village, rises in latitude $8^{\circ} 50' N.$, westward of Caledonia Bay on the Atlantic; its course appears to have been the favorite track of the buccaneers from the Atlantic to the Pacific. Captains Coxon, Harris, and Sharp with 330 men in April, 1806, started from Golden Island in Caledonia Bay, and on the second day reached the head of this river, which they describe as so serpentine that they had to cross it every half mile, sometimes up to their knees, sometimes up to their middle, and as running with a very swift current. On the fifth day 70 of the men embarked in canoes, but found that mode of traveling quite as wearisome as marching, for at almost every furlong they were constrained to quit their boats to launch them over rocks, or over trees that had fallen athwart the river, and sometimes over necks of land. Early on the eighth day they reached Yavisa, which is 15 miles from Santa Maria, at the junction of the river of the same name, now the residence of the principal authorities of the province. Here they halted to prepare for the attack on the fort. They also made paddles

and oars to row with, for thus far down the river the canoes had been carried by the stream and guided by poles, but here the river was broad and deep. On the morning of the tenth day they attacked and carried the fort, but without gaining the expected amount of plunder, although a buccaneer says, 'We examined our prisoners severely.'

"SAVANNAH RIVER rises in latitude $8^{\circ} 44'$ N. and a few miles from its source meets the river Loro, where the bottom is level with the half tide. Below this point for about 10 miles there is a general depth of $1\frac{1}{2}$ fathoms, except in two places, where banks with only one-fourth fathom extend from shore to shore; thence to the mouth of the river, a distance of 12 miles, there is a good navigable channel with a least depth of $3\frac{1}{4}$ fathoms, except for a stretch of $1\frac{1}{4}$ miles with $2\frac{1}{4}$ fathoms, just above the junction of the Rio Ingles. The navigable entrance is about three-fourths mile wide between Graham Point and Haydon Bank, the channel narrowing within to about three-eighths mile. The shores of the river are low mangrove land, skirted with hills 200 to 300 feet high, within 2 miles of the banks. H. M. S. *Virago* anchored in $3\frac{1}{2}$ fathoms, 1 mile northeast of Graham Point.

"THE DARIEN CANAL ROUTE, so called, asurveyed by Commander Selfridge, U. S. Navy, in 1870 and 1871, ascends the Savannah River 24 miles to the junction of the Loro, and then the latter to its source; thence it crosses a ridge and descends the La Paz to the Chucunaqua, crosses the latter, and ascends to its source, the Sucubdi, a tributary from the east; thence it crosses the divide at about 4 miles from the Atlantic coast, with an elevation of 1,003 or 1,259 feet, and descends to Caledonia Bay by either the river Aglaseniqua or the Caledon.

"A variation of this route, starting from the junction of the La Paz with the Chucunaqua, ascends the latter some miles to the Morti, and this river to the divide, with here an elevation of 1,137 feet, descending thence to Caledonia Bay by the river Sasardi.

"A canal by way of the Sucubdi would require a tunnel 10 miles long to connect the elevation of 160 feet on the Atlantic slope with a corresponding height on the Pacific slope; in addition there would be an average cutting of 130 feet for 10 miles or more, and the Chucunaqua to be crossed by a costly aqueduct. The route by way of the Sasardi and Morti presents results of the same character and no less unfavor-

able. The impracticability of the Darien route was considered by Commander Selfridge as fully established.

“By the report of the Isthmian Canal Commission the Salsardi route would require a tunnel 1.6 miles long, assuming an open cut to be used to a depth of 400 feet; and if the Aglaseniqua or the Caledon were used the tunnel would be about 2 miles longer, while the approaches on the south side would be much heavier. The total length of canal navigation from Caledonia Bay to the mouth of the Savannah River would be about 50 statute miles.

“SAN JOSÉ BANK, a dangerous shoal in the center of which is the Trollope Rock with only 2 feet of water on it, lies in the fairway of vessels bound to Panama from the southward, the rock being 15 miles N. 88° W. from Garachiné Point and 10 miles S. 62° E. of Galera Island, the southeasternmost of the Pearl Islands. The bank is 1 mile in diameter within the 5-fathom line and $2\frac{3}{4}$ miles long by 2 miles wide within the 10-fathom line, outside of which the water deepens in general quickly; close to the rock are $2\frac{3}{4}$, $3\frac{1}{4}$, and 4 fathoms. Vessels should not approach within the depth of 10 fathoms.

“MARKS.—The Trollope Rock may be easily avoided, either by keeping along the main shore until past Garachiné Point, or by passing about 2 miles from Galera Island, with care for the shoal patch and rocks off its southern side.

THE PEARL ISLANDS.

“THE PEARL ISLANDS, also known as *Islas del Rey*, *Islas del Istmo*, and *Islas de Colombia*, form an archipelago consisting of 16 islands and numerous rocks, covering an area of 450 square miles on the eastern side of Panama Gulf, the northern extremity being 33 miles southeastward of Panama city and 15 miles from the nearest part of the mainland. Rey Island is the largest of the group; San José, Pedro Gonzales, Bayoneta, Casaya, Saboga, Pacheca, and Contadora are of secondary and the rest of minor importance. Scattered among these islands are numerous fishing villages, containing 1,941 inhabitants in 1843, chiefly engaged in the pearl fishery, which formerly produced about 2 gallons of pearls a year. The pearl shells gathered here, also an article of commerce, are known as Panama or Bullock shells, and are shipped to San Francisco or Panama in barrels.

“These islands are low and wooded; the soil is fertile but

not much cultivated. The numerous cocoanut groves and bright sandy beaches, interspersed with small rocky bluffs crowned with trees, give them a pleasing appearance.

“SABOGA ANCHORAGE.—This good and spacious harbor, about 2 miles long, north and south, and nearly 1 mile wide, with an average depth of 9 fathoms, lying at the extreme northern end of the archipelago, is formed by three islands and numerous islets and shoals. Saboga, the largest island, $1\frac{3}{4}$ miles long by an average width of one-half mile, is on the southwestern side. From its northern end a reef and shoal extend $1\frac{1}{4}$ miles to the northward, protecting the harbor on the west. Contadora Island, $1\frac{1}{2}$ miles long and one-half mile wide, forms the southeastern side; and Pacheca Island, three-fourths mile long and one-half mile wide, the northern side. About midway between these two islands is Bartholomew Islet, north and south from which extend shoals, protecting the harbor on the east side.

“CHANNELS.—Three channels lead into the harbor, respectively from the northwest, the east, and the south. The Pacheca Channel, southward of this island, is nearly one-half mile wide and appears to carry a depth of not less than $5\frac{1}{4}$ fathoms in a straight course, but should be more closely examined, as there is a deficiency of soundings. Bartholomew Islet, on a bearing S. 66° E. (S. 71° E. mag.), leads through in about mid-channel. Contadora, northward of the island, is at present the deepest and safest channel, carrying a least depth of 9 fathoms by keeping the north end of Saboga just open of the south end of Near Islet, S. 85° W. (S. 80° W. mag.). Saboga Channel, between this and Contadora, appears to have a 5-fathom channel, but must be navigated with caution, and is not recommended before further examination on account of the shoals obstructing the entrance and reported shoal patches outside. If this harbor were to be much used a few buoys would greatly assist the navigation.

“A considerable village with a church lies on the northeast shore of Saboga Island, at the head of a bay filled with a shoal and a reef. The usual anchorage is in 7 or 8 fathoms at one-half mile off this village. Contadora has 5 fathoms close along its northwest shore, which is low and well adapted for wharves.

“TIDES.—High water, full and change, at Saboga anchorage is at 4h. 0m.; springs rise about 14 feet.

“CHAPERA AND PAJAROS, the next islands to the southward of Contadora, have a 4-fathom channel between them, but it should not be used, as the ground is foul. A $2\frac{1}{4}$ -fathom shoal lies three-fourths of a mile eastward of Pajaros, and southward of this island the soundings are very irregular, with rocky bottom. No vessels should attempt the passages between Pajaros and Rey islands without previous examination and marking the points of the shoals.

“CASAYA, BAYONETA, AND VIVEROS are the largest of a cluster of islands on what may be termed an extensive reef, about 8 miles long by 5 miles broad, stretching off the northwest point of Rey Island. There are also numerous islets and rocks rising from the reef, and the passages between them all are foul, with occasional strong tides. A bank $1\frac{1}{2}$ miles long by three-fourths mile wide, with only 9 feet of water on its shoalest part, lies nearly 4 miles eastward of the north point of Casaya, and the Caracoles and Cangrejo islets, with foul ground around them, lie about 2 miles off the northeast point of Viveros.

“CLEARING MARKS.—The entire group of islands stretching northwestward from the northwest point of Rey Island should be avoided by Panama-bound vessels, which should not approach the islands on their western side nearer than just to open the eastern point of San José eastward of Pedro Gonzales Island, bearing S. 6° E. (S. 11° E. mag.), and on their eastern side should not open San Pablo, an islet off the northeast side of Rey Island, or bring it to bear eastward of S. 31° E. (S. 36° E. mag.).

“REY ISLAND, the largest of the Pearl group, is about 15 miles long, north and south, by 7 miles wide, with several peaks, the highest being 600 feet high. Numerous islets and shoal patches, with deep water between them, lie 3 miles off the western shore, but should not be approached by strangers within the depth of 10 fathoms. Cocos Point, the south extreme, is the end of a remarkable promontory, 4 miles long by about 1 mile wide, jutting southward into the sea. Its extreme cliff was crowned in 1859 by an umbrella-like tree, making it conspicuous.

“Off the eastern shore of Rey are also islands, but they are steep-to and may be approached within one-half mile, with the exception of Cañas Island, off which is a 3-fathom patch lying outside a sunken rock, nearly $1\frac{1}{2}$ miles from the shore. This

may be easily avoided by not opening Monge Islet eastward of St. Elmo Island until Pablo Islet opens eastward of Muerta, a small barren islet lying about 1 mile northward of this patch.

“ST. ELMO BAY, on the east side of Cocos Point, is open to the southeastward, but has convenient anchorage in all parts, in 6 to 9 fathoms, and a good stream of water near Lemon Point at its head.

“SAN MIGUEL, the principal town of these islands, is on the north side of Rey. It is of considerable size, with a conspicuous church, but is badly situated, landing at low water being difficult. Cerro Congo and Cerro Vali rise southward of the town, the former being 481 feet high. Supplies are uncertain and dear, all productions of the island being generally sent to Panama.

“ANCHORAGE.—Vessels having to lie off the town should run in between Caracoles and Cangrejo islets, taking care not to shoal the water under 7 fathoms at low water and using caution in the approach, as the bottom is irregular and rocks abound; anchor in about 6 or 7 fathoms when the church is shut in, or behind Afuera, an islet lying off the town, bearing S. 29° E. (S. 34° E. mag.).

“GALERA ISLAND, lying 8 miles S. 81° E. from Cocos Point, is small, and, like the point, remarkable for its umbrella tree. A cliff forms its southern side, sloping down to a beach on the north, and to the southward a reef runs off for nearly 1 mile. This island is generally the first land made by vessels bound to Panama; it should not be approached within the depth of 10 fathoms, but between it and Cocos Point there is a good passage by using which the vessel will be clear of the San José Bank, 10 miles to the southeastward.

“PEDRO GONZALES ISLAND, separated from the islets off the west side of Rey by a broad, deep channel, is of irregular shape, with an extreme length, northwest and southeast, of $3\frac{5}{8}$ miles by an average width of one-half mile, and has on its northern side a wide and deep indentation forming two bays, Perry and Magicienne, partially protected on the north by the small islands Señora and Señorita. Trapiche Island, 100 feet high, which is connected by a sandy neck with Gonzales at low-water springs, forms the division between the two bays. Off the east point of Trapiche extends a rocky ledge, and from this extends a shoal with 14 feet of water at the end,

nearly 600 yards from the point. Perry Bay, which lies within this shoal and Swift Point on the opposite side, is a mile wide and penetrates nearly a mile, affording anchorage in 5 to 7 fathoms, with good protection from wind and sea.

"A large stream of water, found in full force in the month of April at the end of what had been considered a remarkably dry season, runs into the sea on the western side of Magicienne Bay. This bay, however, is small and shoal, having only a tongue of deep water, $3\frac{1}{4}$ fathoms, projecting three-eighths mile within the entrance, with a width of one-eighth mile. Señora, wooded and 70 feet high, and Señorita, small and 40 feet high, with the shoals off their eastern sides, have an extent of about 1 mile, and are separated from Trapiche by a 7-fathom channel, steep-to on both sides.

"Perry and Magicienne bays were examined in 1858 as to their capabilities for a depot for steam vessels. Although not considered so good and not so near Panama as Saboga anchorage, they were thought to have some advantages.

"TIDES.—High water, full and change, in Perry Bay is at 3h. 50m.; rise, 16 feet. The tidal streams are not felt at the anchorage, but off the island there is a considerable set, the flood running northward and the ebb southward, the latter being generally the stronger.

"DIRECTIONS.—Vessels may pass on either side of Señora and Señorita Islands, taking care to avoid the shoal eastward of them, if passing on that side, by keeping the eastern point of Gonzales Island, a rocky peninsula, open of the point next north of it, bearing S. 17° E. (S. 22° E. mag.) until Punta Piloto, 120 feet high, the north extreme of Gonzales, bears to the westward of S. 73° W. (S. 68° W. mag.); if entering Perry Bay, the shoal off Trapiche may be avoided by not passing westward of midway between this island and Swift Point.

"SAN JOSÉ ISLAND, lying 4 miles south of Gonzales, is about $6\frac{1}{2}$ miles long by 3 miles wide, and its summit forms a tableland said to be a considerable grazing ground. Nearly 2 miles southeast from Iguana Point, the north extreme of the island, a large waterfall, running into the sea, affords an excellent watering place. A deep bay indents the southeast side of the island, but the swell sets in there with great violence. Off the southern end are a number of high rocks of singular and fantastic shapes, also lashed by a heavy surf; this part of the island should be avoided. The western shore

is bold and cliffy, with a small bay near the middle, opening to the northwestward.

“THE CHANNEL, $6\frac{1}{2}$ miles wide, between Rey and San José, is foul on the Rey side, but deep and clear on the San José side, the depths exceeding 20 fathoms for two-thirds the length of the island.

“PASSAGE ROCK.—This dangerous sunken rock, with 12 and 9 fathoms close around it, lies near the middle of the channel, otherwise deep and clear, between San José and Gonzales islands.

“CLEARING MARKS.—The peak next south of the highest on Rey Island, just open south of Coco Islet, one of the outlying islets off the west side of Rey, bearing N. 78° E. (N. 73° E. mag.), leads more than one-half mile southward of Passage Rock; vessels should keep between this line and the San José shore.

“BOUND TO PANAMA.—Vessels bound to Panama from the northward should make the island of Jicaron, which lies about 50 miles westward of Mariato Point, and from here endeavor to keep under the land as far as Cape Mala, or, if unable to do this, push across for the opposite coast, where the current will be in their favor. On getting to the eastward of Cape Mala, the safest plan is to shape a course for Galera Island and use the eastern passage, that between the Pearl Islands and the main; if, however, tempted up the gulf by a fair wind, vessels should endeavor to get on the western coast of the Pearl Islands, for the reasons noted below.

“The passage from the southward into the Gulf of Panama is easily made during the greater part of the year by keeping about 60 miles from the coast north of Guayaquil, and after crossing the line shaping a course for Galera Island, taking care, especially in the dry season, to stand inshore with the first northerly wind. By so doing vessels will most probably have the current in their favor along the coast, whereas by keeping in the middle or on the western side of the gulf a strong southerly set will be experienced. After making Galera and clearing the San José Bank the navigation between the Pearl Islands and the main is clear and easy, with the advantage of being able to anchor should the wind fail or the tide be unfavorable. As a rule this passage should be taken, but with a strong southerly wind the navigator is tempted to run up the bay, in which case he should keep on

the western shore of the Pearl Islands, where less current will be found, and anchorage should the wind fail, an event always to be expected in these regions. Between Chirambira Point and Cape Corrientes the land is low and faced with shoals, caused by the numerous rivers that have their outlets on this part of the coast; but after passing Cape Corrientes it may be approached fairly close except off Solano Point, where some rocky shoal patches extend seaward, as the coast is in general bold-to. Care, however, should be taken not to run into the calms caused by the high land, as it is difficult to get off into the breeze again, and the swell sets inshore, where there may be no anchorage until close to the rocks.

"In beating up the Gulf of Panama in the fine season, the eastern passage is to be preferred, as, with one exception, it is free from dangers, the water is smooth, and a regular tide enables more northing to be made than would be possible in most cases against the strong current and short high sea which at this season prevail in the middle or on the western side of the gulf. During the rainy season a straight course up the bay is preferable to becoming entangled with the islands, the current generally following the direction of the wind.

"BOUND FROM PANAMA.—The great difficulty, however, is the passage out from Panama Bay. Pizarro, the first to attempt this, in November, 1525, after beating about for seventy days, was forced to return to the river Chiman.

"The best plan for all sailing vessels, whether bound for ports north or south of Panama, is to push to the southward and gain the southeast trade. By so doing they will not only avoid the doldrums and vexatious winds, but will have the additional advantage of salubrious weather, with the sea at a temperature of 75° instead of 83° F. Between January and April it may be better for north-bound vessels to cross the line between the Galapagos Islands and the coast before pushing westward, keeping south of the line until westward of 105° W., when a course may be shaped for 10° N. and 120° W., in which track they will probably find the northern trade. This will generally prove far preferable to encountering the vexatious weather met with at this season north of the Galapagos.

"The passage to the northward has been made by keeping

close inshore after passing Cape Mala, and navigating by the land and sea breezes; but this should be attempted only by vessels that are well found and manned, unless bound to the ports of Central America, when it is their only route.

“The passage to the westward during the rainy season is a most tedious affair. Calms, squalls, contrary winds and currents, a heavy swell, and extreme heat, as well as an atmosphere laden with moisture and rain, are the daily accompaniments. It often occurs that 20 miles of westing are not made in a week, and it is only by the industrious use of every squall and slant of wind that the passage can be made.

“In the navigation of these regions and of the coasts of Central America and Mexico even small auxiliary steam power proves most useful.”—*West Coasts of Mexico and Central America. Hydrographic Office, No. 84, 1902.*

“ISLANDS, ETC.—There are on the coast and on the banks of rivers marshes or ponds more or less permanent and extensive.

“Both the Atlantic and the Pacific coasts are sprinkled with islands, in some spots so thickly grouped as to constitute archipelagoes.

“On the Atlantic side there are some 630 islands and islets, with an aggregate area of 147 square miles, of which about 115 square miles are susceptible of utilization for lumbering or colonization. The remainder is waste, unsheltered, and lacks both water and vegetation.

“The islands of this Department on the Pacific coast are larger and more numerous than those on the Atlantic side. In the group known as the Archipelago de las Perlas the principal island is that of San Miguel, which is about 16 miles long by 7 or 8 miles wide. The largest island on the coast is that of Coiba, a few miles from Bahia Honda, whose greatest length is some 22 miles and its greatest breadth is 15 miles. These Pacific islands are said to number in all 1,053, with an aggregate area of about 500 square miles.”—*Handbook of Colombia, Bureau of American Republics.*

“Between Saboga and Bartoleme islands, in the north part of Perlas Archipelago and about 40 miles southeast of the city of Panama, is a fine anchorage for a fleet of at least 10 large vessels.”—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

PORTS, BREAKWATERS, ETC.—*Colon.*—“Colon is located on

a flat island in the bay of Limon. The main harbor is located on the west side of the city. On Point Toro, opposite Colon, is located a strong light, about 75 feet high, which can be seen for about 20 miles at sea. On the point of the island, in the city of Colon, is also located another light, about 30 feet in height, which can be seen at least 12 miles at sea.

"There is also another bay on the east side of the city of Colon. The largest ships may anchor in either one of these bays. All along the water front of Colon are located ships' piers. In case of storms coming from the north ships must leave the harbor and also the docks and proceed to Portobelo for protection. There is a plan proposed to build a break-water at Colon, at a cost of about \$1,500,000, to protect the harbor. This is quite practicable and would render the harbor safe. Of the two ports, Portobelo is very much the better, but no land communication is to be had with Colon except by a trail.

"No timber exists in the vicinity of Colon, yet a small amount of large pine timber could be found in the railroad yards.

"Small boats could be landed along the shore about one-half mile south of the wharves. The anchorage in the harbor off Colon is sufficiently large for almost any number of vessels."—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

"The harbor of Colon is not by any means a safe one, as it is without natural or artificial protection, and during the 'norther' season—January, February, and March—vessels are in danger of heavy damages. The wharves here, which are owned and controlled by the Panama Railroad Company, are five in number. Four of them are modern steel and iron structures and afford ample room to berth twelve ocean-going steamers and a number of smaller sailing craft. The harbor entrance and the wharf slips have recently been dredged, so that vessels of 28 feet draft may be safely docked."—*Commercial relations of the United States with foreign countries during the year 1900.*

Panama.—"Ships which do not enter the harbor of Panama northeast of the city or the harbor of La Boca may find anchorage on the north side of Culebra Island, where there is located a small town. There are three lighters owned by the English company, which run from their pier at La Boca to the island of Culebra. Anchorage may also be found for

ships on the northeast side of the island of Taboga. Taboga is a very rich and productive island, where the principal fruits are grown, such as mangoes, pineapples, and bananas. This island is also generally in a very good sanitary condition, and in case of an epidemic of yellow fever, smallpox, or bubonic plague on the Isthmus the richer inhabitants of Panama leave for this island.”—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

“Every steamer or sailing vessel of high freeboard upon arriving in port casts anchor to the north of the Flamenco, Perico, and Naos islands, which are situated $2\frac{1}{2}$ miles south of Panama. The passengers are carried to the wharf of the Panama Railway Company when the state of the sea permits it, as well as the cargo, which is unloaded in large scows of 120 to 300 tons each. The same is done in embarking passengers and cargo. For this service there are at Panama three good-sized strong tugboats, called as follows: *Bolívar*, *Ancón* (which is kept at anchor and in reserve), and *Morro*.

“The two former belong to the Panama Railroad Company and the latter to the Pacific Steam Navigation Company.

“It is very easy to obtain coal and water in this bay, as the aforementioned companies furnish it to all who ask for it.

“This bay also has a cistern boat (steamer) called *Isabal*, and owned by the Pacific Mail Steamship Company. It has a capacity of 47,000 gallons of fresh water.

“In order to ply the waters of the Bay of Panama it is necessary to use tide tables, which can be had in the printing office of La Estrella de Panamá, where they have been published for years, and are compiled by seamen who are well acquainted with the bay.

“Between the wall or bastion of Chiriqui, which is situated to the east, and the northeast coast the sea runs in a considerable distance, forming an excellent roadstead, at the head of which are situated the public market of the city and four large wharves—that of the market, where the coasting trade is carried on; the American wharf, alongside which come the tugboats and bongos, and where the products in transit or brought for Panama from the Pacific coast are loaded and unloaded; the English wharf of the Panama Railroad, where the Pacific Steam Navigation Company transacts its business, and the coal wharf, where this combustible is loaded in order to transport it to Flamenco.

"The constant movement in this excellent roadstead of hundreds of caiques, scows, sloops, schooners, and tugboats which are continually entering and leaving, mostly with unfurled sails, together with the noise caused by the engines and cars of the railroad and by the carriages and wagons which arrive in considerable numbers from the center of the city and leave from the market and wharves, lend this place the lively aspect and air of greatness peculiar to all busy ports.

"Panama at high tide, and seen from seaward, is beautiful and looks like a European port."—*Directory of Panama, 1898.*

"*La Boca.*—Mr. Francis Gudger, vice-consul general of the United States at Panama, has furnished a description of the wharf at La Boca. This wharf was built by the Panama Canal Company, but is now controlled by the Panama Railroad Company. The rates charged for vessels coming alongside are governed for the most part by contract.

"The wharf, constructed wholly of steel, with a roof and sides of corrugated iron, is situated at the mouth of the Panama end of the Panama Canal, about $2\frac{1}{2}$ miles from Panama City. During its construction its failure was predicted on account of the great rise and fall of the tide; also because of the difficulty of keeping the channel leading to the wharf open, as a great amount of mud is brought down by the San Juan River. The difficulties have been reduced to a minimum. Vessels are not lashed alongside the wharf, but have floats placed between them and the wharf, so that there are no bad results from the tide. The cranes or winches on the wharf are of a special kind that permit of working the cargo at all stages of the tide. The following measurements will give an idea of the size and capacity of the wharf:

Total length.....	feet..	985
Total width.....	do....	54
Depth of channel alongside at high tide.....	do....	45 $\frac{5}{8}$
Depth of channel alongside at low tide.....	do....	26 $\frac{1}{4}$
Width of channel alongside.....	do....	98
Cranes (six of 2 tons each, one of 20 to 24 tons).....	number..	7
Capacity of vessel space.....	feet..	985
Tonnage of largest vessel yet docked.....	tons..	4,600
Railroad tracks on wharf.....	number..	2
Car capacity of tracks on wharf.....	cars..	39

"It is possible to dock any vessel drawing less than 26 feet 6 inches.

“In speaking of the channel alongside it might be well to explain that this is not exactly a channel, but what is called a souille, or basin, in which the vessels lie, and in which there is a maneuvering space, at any stage of the tide, of 486 feet. The bottom of this basin is soft mud, yet, while it is considered best for the vessels to be at all times afloat, they can rest easy in the muddy bottom. From the above it is seen that any vessel of 500 feet length and not drawing more than 26 feet can be handled at this wharf with facility.”—*Monthly Bulletin of the Bureau of American Republics, August, 1901.*

“A branch of the Panama road runs from the city of Panama through the town of La Boca to a large ships’ pier in La Boca Harbor.

“It contains facilities for docking 3 large ships at the same time. There are 16 steam cranes and 4 electric cranes on the dock. On the end of the pier is a large 20-ton crane. The rise and fall of the tide is over 20 feet; but owing to the dredging which goes on all the time ships can come in at any stage of the tide.

“Across the Rio Grande from the town of La Boca, about 700 yards away, can be seen the mouth of the south entrance to the canal. The harbor at La Boca and the harbor of Panama might be commanded perfectly by artillery placed upon the hills between the two places. La Boca is also commanded by a hill to the east, shown in the charts, about 1,000 yards away. There is a first-class wagon road between Panama and La Boca.”—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

“*Various Ports, etc.*—For traveling to any points in the interior of the Department, except those between Panama and Colon, although there are a few bridle paths, the most convenient, cheapest, and shortest routes are by sea or rivers.

“To the west of the city of Panama are situated the most populous and richest provinces of the Department, for, although Darien, which is situated to the east, possesses such great and varied natural riches that they will without doubt render it an emporium when its day arrives, they are not yet under exploitation, with the exception of the rich gold mines of Espíritu Santo and Cana.

“To the west are situated the provinces of Coclé, Veraguas, Los Santos, and Chiriquí, and to the northwest the flourishing district of Bocas del Toro, belonging to the province of Colon.

“Travelers may reach these points as follows: From Colon to Bocas del Toro in steamers or in some of the sailing or steam vessels which are engaged in the banana traffic.

“The provinces of Coclé, Veraguas, Los Santos, and Chiriquí have their harbors on the Pacific or on some of the rivers which empty therein and are navigable for minor craft and sailing vessels. Traffic between Panama and these provinces is carried on in greater part by sailing vessels, except that to Chiriquí Province, where, at Port David, steamers touch with considerable frequency, because of the growing commerce of that province with and its proximity to the Republic of Costa Rica.

“The province of Coclé has several harbors, but that of Aguadulce is the one preferred, because steamers visit it also. The city of Penonomé, capital of the province, has for its service the harbor of Posada on the river Coclé. The port of Aguadulce will not, however, lose its prestige, and it will certainly always be preferred by travelers bound for the towns in the province mentioned (Nata, Anton, Penonomé, etc.), and even for the contiguous provinces of Los Santos and Veraguas, owing to the advantageous circumstance that, as before stated, steamers and large sailing vessels touch there.

“The province of Veraguas has the harbors of Montijo and Sona on the rivers San Pedro and San Pablo, which empty into the Gulf of Montijo and are navigable in their headwaters with minor craft and sailing vessels. But since, in order to go from Panama to these harbors, it is necessary to double the peninsula of Azuero, the port of Aguadulce is preferable in going to Santiago (capital of the province). From this port (Aguadulce) the traveler goes to Santiago by a good wagon road. There are over a hundred wagons at Aguadulce to attend constantly to the transportation of passengers and freight.

“The port of Aguadulce, after those of Panama, Colon, Bocas del Toro, and Pedregal, is the most frequented and visited by steamers. This port is situated in the Gulf of Parita, which forms part of the great Gulf of Panama, and it is owing to this advantageous position that it serves as a stopping place for steamers and sailing vessels.

“From the maritime salt works owned and operated by the National Government at Aguadulce almost all the towns in the department are supplied with salt.

“The province of Los Santos, which is situated on the peninsula of Azuero, possesses many commodious maritime ports, the principal of which are Chitré, Las Tablas, and Monsabé.

“The Pacific Steam Navigation Company dispatches one or two steamers every month from Panama, which stop at Aguadulce, Remolino, San Lorenzo (when necessary), Sona, Pedregal, and Puntarenas (Costa Rica).

“For voyages to the archipelago de las Perlas and to Darien they put into service coast-trading vessels, which enter and ascend the Tuira, a river of great volume and navigable by steam as far as Yavisa. The Darien Gold Mining Company dispatches regularly a steamer to the port of Yavisa.

“The fares on the sailing vessels to these ports are as a rule very reasonable, varying from \$2 to \$5 per person, according to the class in which the passenger wishes to travel.”—*Directory of Panama, 1898.*

TIDES.—“The tides vary considerably with the seasons, and are much higher at Panama than at Colon. In Colon Bay the difference between ebb and flow seldom exceeds 12 or 14 inches, and is often scarcely perceptible for days together, whereas in Panama Bay it is as much as 8 feet in the early summer (May and June), when it is least felt, and rises to 20 or even 23 feet in winter, the average for the year being 13 or 14 feet—that is, as many feet as inches on the opposite side. The consequence is that in an open canal without locks no equilibrium could be established, the current constantly shifting with the alternating tidal currents.”—*Stanford's Compendium of Geography, Central and South America.*

(d) CITIES.

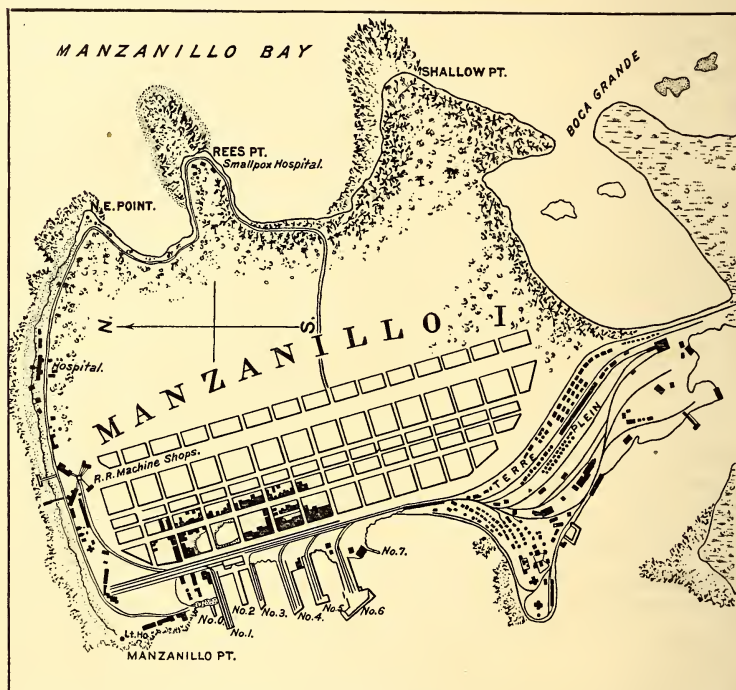
Colon.—“Under the old régime of Spain the only line of communication between the two oceans was one simple mule path crossing the Isthmus from Panama to Porto Bello, on the Atlantic side. Porto Bello Harbor is commodious and deep, but the fortifications of the old seaport are now overgrown with forest vegetation and the place has become an obscure hamlet, occupied by a few hundred negroes, who do a little trade with Colon, Colombia, and Jamaica.

“The deadly Chagres fever raged so there that the port was practically abandoned, and Chagres became the Atlantic

terminus of the isthmian route from Panama. But Chagres soon won fame as a hotbed of marsh fevers and the population rapidly disappeared.

"A new port was founded, therefore, which was called Colon, in honor of Columbus, who discovered the bay. It became known also as Aspinwall, from the name of one of the chief promoters of the isthmian railroad. This name in late years has been very little used.

"After Colon was burned in the revolution of 1885 it was



COLON.

rebuilt on a larger plan and on better-drained ground, but it is still a very unhealthful place."—*New York Sun*, November 15, 1903.

"The city of Colon has a population of about 13,000. The mean temperature is 80.6° F. The air is most oppressive and saturated with moisture. The city is generally composed of miserable frame houses and small stores. At the mouth of the canal is a fine statue of Columbus, and near it are grouped the houses of the old French company, now unoccupied, but still in a fair state of repair. Two of these were

once handsome—the houses of M. de Lesseps and his son. At the other end of the city is the large hotel owned by the railroad company and about it are grouped many comfortable houses belonging to foreigners. The other chief buildings are the stations and storehouses of the railroad and steamship companies. These could be used as excellent barracks for troops to the number of 1,200.

“A great many supplies, such as canned goods, could be obtained in Colon. There is a hotel in Colon, run on the American plan, which will accommodate about 100 to 150 people. The best drinking water obtainable is from the cisterns. Supplies of all kinds could be transported across the Isthmus by the railroad.

“The buildings which might be used as barracks for troops have already been mentioned. Near Colon there are really no suitable locations for camps, the country being generally too swampy about the city. The climate is hot. The rainfall during the rainy season is very heavy.

“Troops should not be landed from ships in Colon for any length of time before operations were to begin. It would be preferable to keep them aboard ship. The sanitary condition of Colon could be very much improved. At present it is very bad.

“There is an old frame building, covered with galvanized iron, two stories in height, above 50 by 70 feet, along the railroad in the southern part of the town which was used as a railroad station, but it is now occupied by about 75 Colombian troops.

“The population of Colon is made up of a few Americans, who have small stores, quite a number of French, who have general merchandise establishments, and a few Jews, who are money changers and pawnbrokers. The negro population are generally English subjects and come from the island of Jamaica.

“The railroad trains all have good, energetic American conductors and engineers.

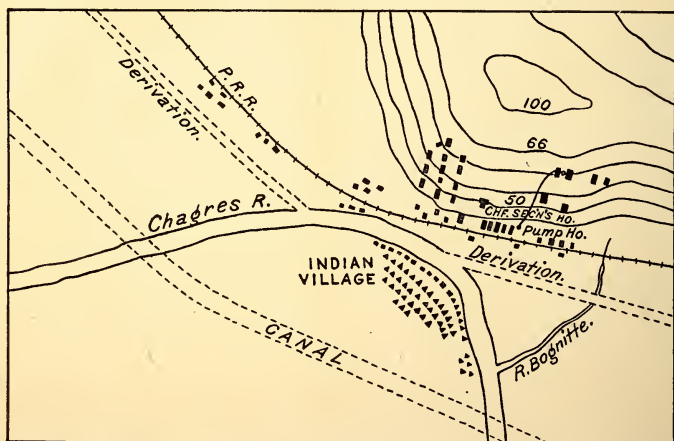
“Coal for ships and for the use of the railroad company is shipped from Norfolk, Va., generally. The railroad company generally keeps a supply of about 500 tons. The maximum rise and fall of the tide at Colon is 2 feet.”—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

“At Colon is the ice plant of the Panama Railway Company. The output is about 35 tons monthly. Its capacity is

2 tons per twenty-four hours. The ice is sold at the rate of 1 cent per pound gold, but only to employees of the railroad."—*Commercial Relations, 1898 and 1902.*

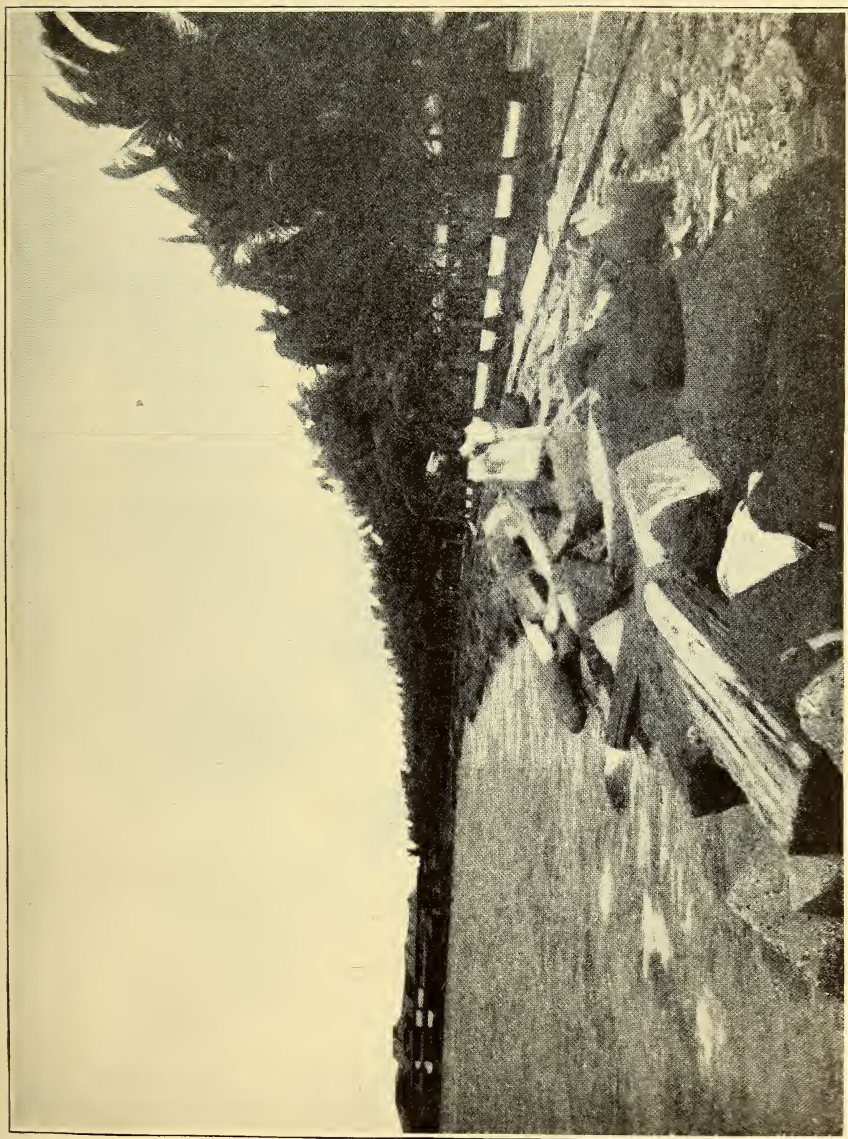
"There are ample quarters; best near light-house or on terreplein. Hospital accommodation, 500; water supply, fair. Principal water supply from Frijoles or Monkey Hill. All water should be boiled before use. Ample stores. Telegraph cable to Jamaica lands over the reef at a hut with shed roof near light-house. Landing best made at wharves or to leeward of terreplein. As a rule wharves have no steps or derricks; No. 7 is an exception; artillery may land on it. Landing may be made by a limited number of boats in a bight on eastern shore, near Rees Point; it should be approached with caution. A cart road leads from this point across to town, entering it abreast of Pacific Mail Steamship wharf. Landing can also be made from Limon Bay upon canal, between kilometer 3 and 4. The beach here is hard; no surf. The causeway and wharves should be guarded. Numerous tugs, steam launches, and barges belong to canal. Dry dock near canal entrance. The Chagres is navigable for boats up to Gatun.

"*Buhio Soldado*.—Sixteen miles from Colon; 215 frame houses, 120 huts. Small machine shop. Springs of fairly good water near railroad station. Telegraph station.

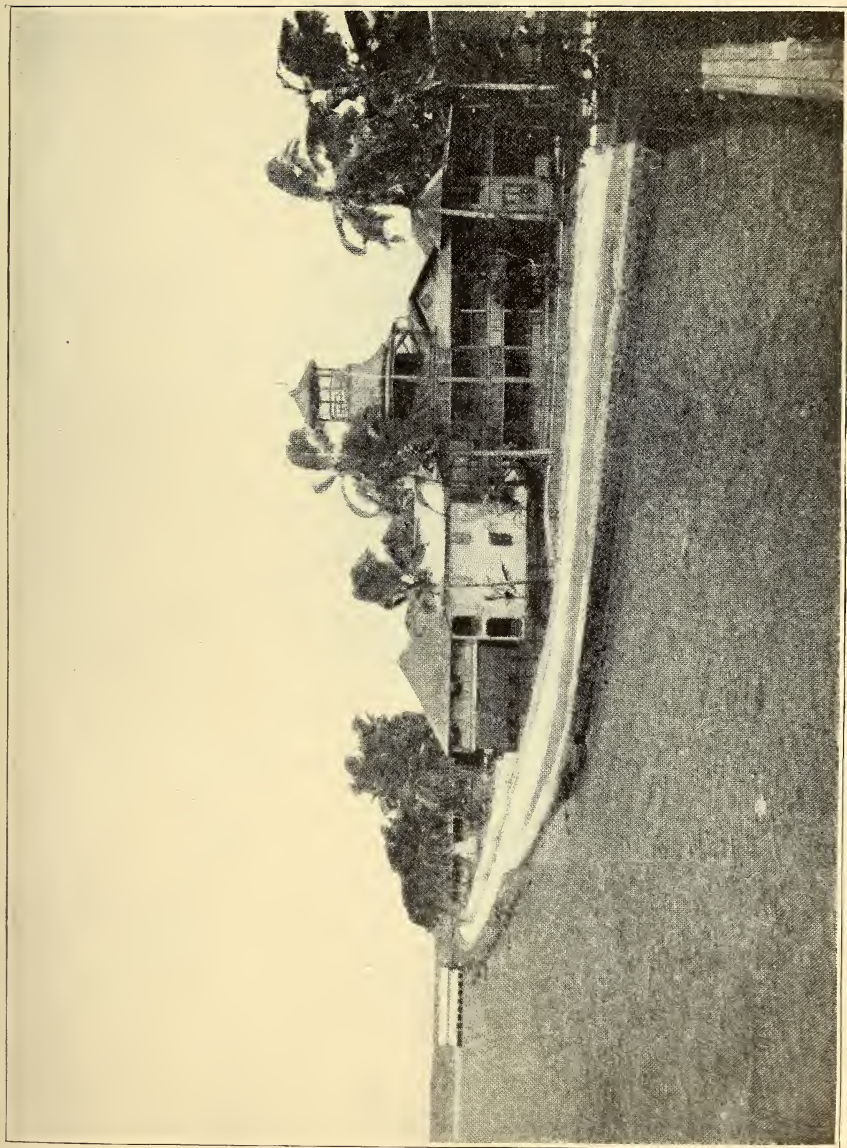


GATUN.

"*Gatun*.—Seven and one-fourth miles from Colon. Canal village on east bank of Chagres; Indian village on west bank. Communication with Aspinwall by canal, railway, or Chagres;



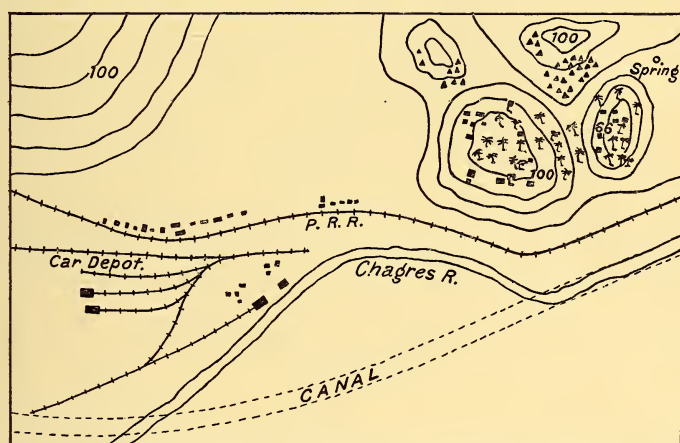
COLON. CHRISTOPHER COLUMBUS AVENUE.



WATER FRONT OF COLON.

40 or 50 frame houses; average capacity, 8 to 12 men; 150 huts. Population: White, 75; natives, 1,200 to 1,500. Repair facilities for small vessels. Water tank for locomotives. Potable well and spring water. Telegraph station. River not fordable. Favorable position for resisting attacks. No bridge over Chagres. Railroad bridge over Gatuncillo, two-thirds mile south of railroad station.

“*Frijoles*.—Nineteen miles from Colon. Best and largest supply of drinking water on the Isthmus. The creek from which this is taken should be guarded; best position for guard on Frijole Hill. Steam pumps; water tanks of 8,000 gallons capacity each. Telegraph office. Only a few frame houses and huts.

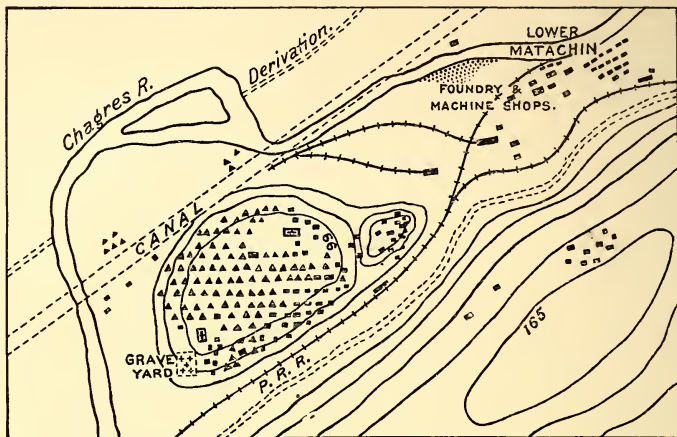


TAVERNILLA.

“*Tavernilla*.—Twenty-one miles from Colon. Canal village; 40 frame houses; 20 huts. Best site for camp on hill to eastward of railroad. Fair supply of spring water.

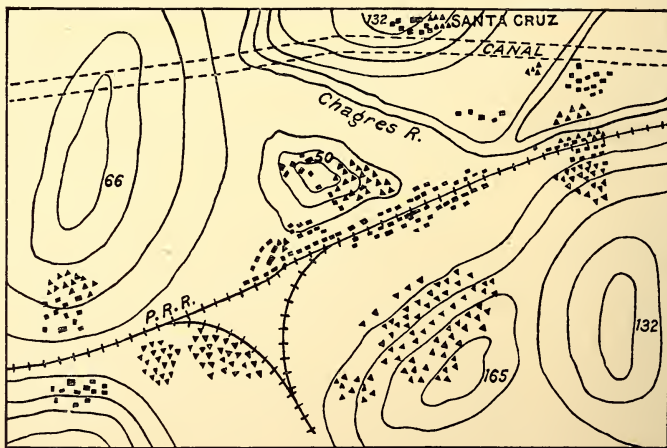
“*San Pablo and Barbacoas Bridge*.—Twenty-three and one-half miles from Colon. Twenty frame houses; 100 huts. Population, 60 whites, 1,800 others. No water in village. Spring on hill at Aspinwall end of bridge, 400 gallons a day. No telegraph. Barbacoas Railroad bridge over Chagres, 700 yards northwest of railroad station, built of iron; stone piers; is 617 feet long; plank footway between the rails. Aspinwall end furnishes best site for camp or guard—one of the most important on line of transit—should be held by strong guard.

"*Gorgona*.—Twenty-eight and three-fourths miles from Colon. Comparatively healthy. Small springs. No telegraph. Forty frame houses; 350 huts. Eighty whites, 2,000 natives, etc.



GORGONA.

"*Matachin*.—Thirty miles from Colon, $17\frac{1}{2}$ from Panama. Unhealthy in late summer and fall. Eighty frame houses, capacity 600 to 800; 200 huts. One hundred whites, 1,000 to

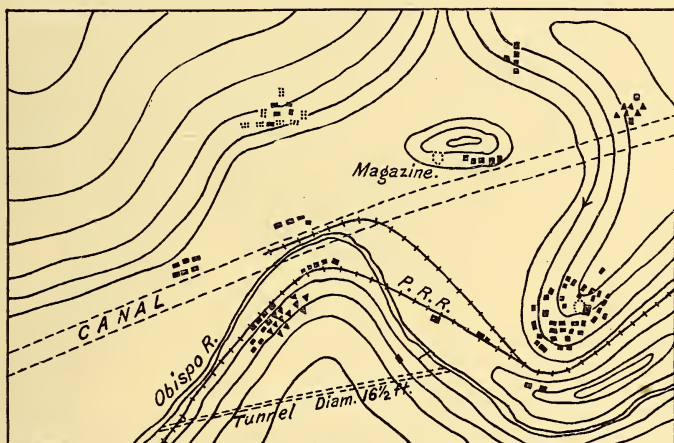


MATACHIN.

3,000 natives, etc. Spring on east slope of hill. River water dangerous. Trail for pack animals between Gorgona, Matachin, and southward. Suspension and pontoon bridges

across Chagres. Chagres here turns to northeast. Strongest site for resistance on hill near railroad track, one-fourth mile to southward of station. It is unhealthy. Best site for camp on hill immediately in rear of railroad station.

"*Gamboa*.—One mile from Matachin. Excellent site for quartering men, holding them ready for active operations at either end of transit. Exceptionally healthy. One hundred huts; 500 native. River supplies good drinking water. Bridle path to Cruces (up Chagres) and Panama. River current very strong.



LOWER OBISPO.

"*Obispo (lower and upper)*.—Thirty-one and one-fourth and 32 miles from Colon. Sanitary conditions unfavorable. Lower Obispo, 90 frame houses, 25 huts; 40 whites, 50 natives. Upper Obispo, 45 houses, 80 huts; 25 whites, 300 natives. Lower Obispo Hill commands river toward Gamboa, path from Gamboa to Lower Obispo, and railroad toward Empire. Railroad bridge over Obispo River at Upper Obispo. Upper Obispo Hill best site from which to guard bridge. Water tank for locomotives. Obispo River supplies fair drinking water.

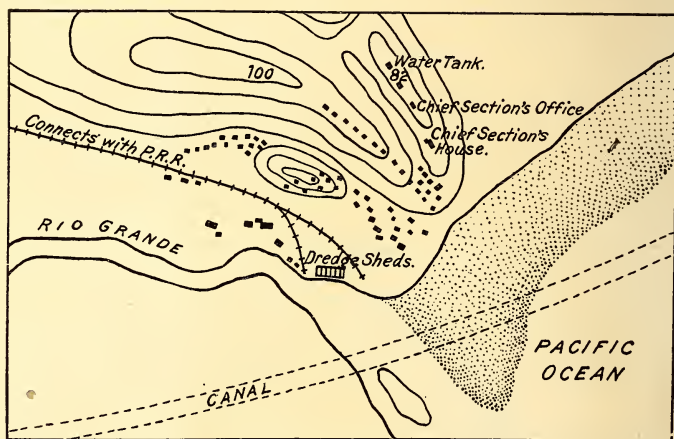
"*Emperador (or Empire)*.—Thirty-six miles from Colon, 11½ from Panama. Eight hundred and fifty frame houses; capacity, 4,000. Eighty whites, 3,300 natives, etc. Fuel abundant. Water brought from Camacho Creek. Best site for camp or resistance on hill. Machine shops. Telegraph.

"*Culebra*.—Thirty-seven and one-eighth miles from Colon,

10 $\frac{3}{8}$ from Panama. The summit. Strong strategic position. Ample quarters—800 frame houses, 400 huts. Good water supply from springs. Machine shops.

"*Paraiso*.—Forty miles from Colon, 7 $\frac{1}{2}$ miles from Panama. One hundred and twenty-five frame houses, 100 huts. Fifty whites, 750 natives. Small springs give limited supply of water. Telegraph.

"*La Boca*.—The Pacific entrance to canal, a suburb of Panama. Railway connection (back of town) with Panama Railway."



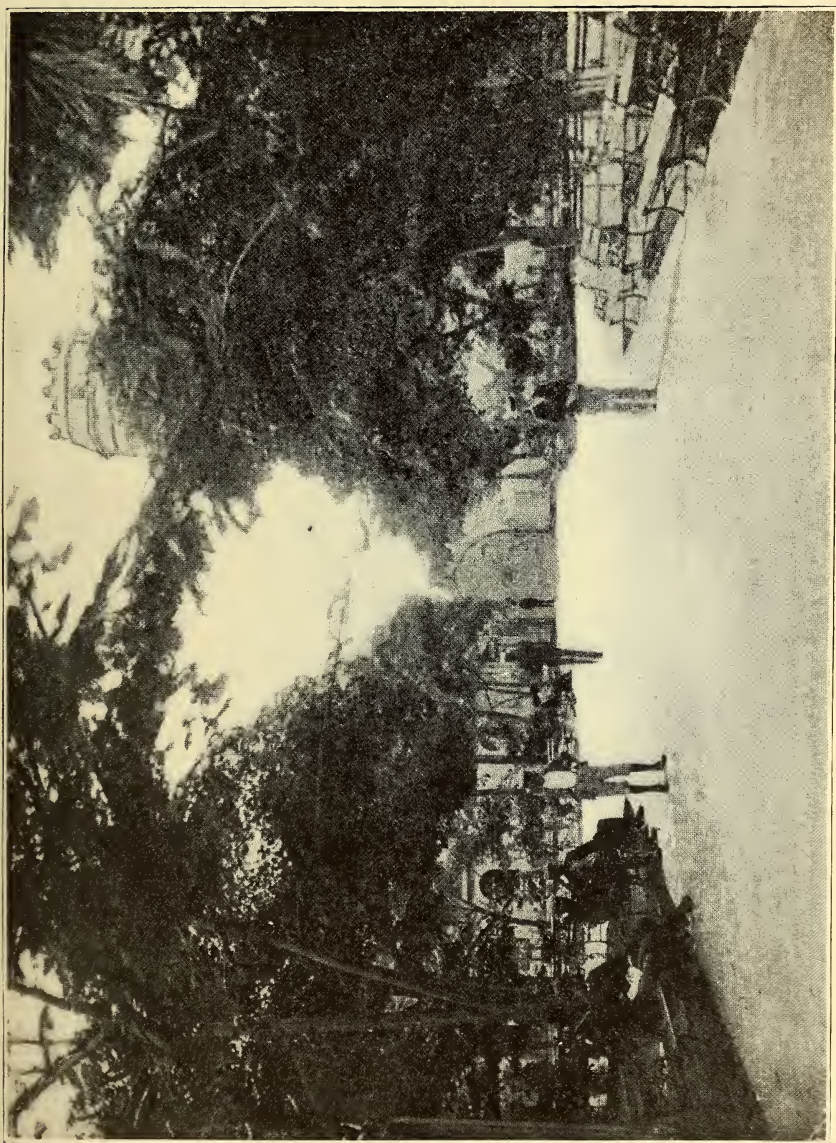
LA BOCA.

Panama.—"About 1518 Governor Pedrarias Dávila transferred to the native village of Panama the episcopal see and the civil government, which had been since 1514 at Santa Maria de la Antigua, in Darien.

"The name of Panama is believed to have come to these coasts from an aboriginal word which signified "abundance of fish," according to several historians, although according to others it was derived from the fact that the town was founded near some large trees which the natives called 'Panama.'

"Hardly had three years passed after the transfer of the ecclesiastical and civil governments to the village of Panama, when the latter obtained a city charter from the Emperor Charles V (1521).

"Panama had a mint, and in 1535 it was made a royal audiencia (judicial district).



PANAMA. CATHEDRAL PARK.

"In this city, in 1525, the conquerors Francisco Pizarro, Diego de Almagro, and Hernando de Luque formed the memorable company to proceed to the conquest of Peru, which enterprise the illustrious Pizarro accomplished in 1532.

"Both ancient and modern Panama were cities which merited the name of opulent owing to the extraordinary commerce which developed in the Isthmus, being the point through which all commerce between Peru and Spain had necessarily



to pass until 1746, when navigation about Cape Horn became frequent.

"Although of later foundation than Portobelo, Nombre de Dios, and other towns, Panama gave its name to the famous isthmus on whose southern coast it is situated.

"Chroniclers, in speaking of the cities of Panama and Portobelo, record the fact that a road paved with flagstones connected the two cities.

"Being the emporiums of commerce between the regions of

the Atlantic and Pacific, Panama and Portobelo had to suffer repeated attacks, either from English and French pirates or from the Spaniards themselves, who raised the standard of rebellion in Peru and Central America.

"The ancient city of Panama was situated about 4 miles to the east of the city now bearing the same name. Travelers still find the ruins of that wealthy city, although they are mostly hidden by an exuberant vegetation. The remains of many public buildings are still seen, such as the tower of the cathedral, the walls of churches, bridges, turrets, cisterns, and part of the pavement of the streets, all covered with enormous fig trees, pepper shrubs, and numerous yerbas moras (a medicinal herb), whose flowers perfume the air with fragrant odors.

"Modern Panama.—After the destruction of the city Governor Fernández de Cordova resolved to change the site and chose for the purpose a short peninsula surrounded by steep rocks, easily defended, at the base of Mount Ancon, about 5 miles southeast of the destroyed city.

"The celebrated engineer Alonso de Villa-Corta constructed a fortified town, the like of which does not exist anywhere else in South America, unless it be Cartagena. He surrounded it with very strong walls several yards thick. The uneven and rocky ground which was inclosed was filled in afterwards, so that the surface of the city became smooth and level, with an elevation of over 20 feet, there having been erected, at each end of the front facing the Pacific, two colossal defensive bastions, in view of which there was a time when it would have been an exceedingly serious and dangerous undertaking to attack this city.

"A century ago Panama was considered one of the richest and most beautiful cities in the world. The galleons which arrived there laden with the rich treasures from Peru, together with the continual passage of adventurers and emigrants bound for Peru, rendered it the most frequented landing point of all western America. * * *

"Owing to its advantages and conveniences Panama would have continued to progress had it not been for a series of causes which started its decline.

"At the time of the great immigration to California and during the period of greatest activity in the work on the isthmian railroad the hope was revived that the city would

return to its former prosperity. It was frequented by innumerable travelers, and its harbors were visited by thousands of vessels, but the opening of the railroad between San Francisco and the Eastern States of the North American Union almost completely exhausted these new sources of wealth.

“Then came the great fire, which occurred March 7, 1878, and which almost entirely completed the work of destruction which had been begun years before.

“Following upon the fire came the epoch of the inauguration of the canal in Panama, an epoch of feverish business activity, when money flowed in torrents.

“The city was soon rebuilt and immediately began to acquire those buildings, parks, and promenades, as well as most of the enterprises, which give it the seal of importance and beauty which it now possesses.

“Unfortunately on June 13, 1894, another conflagration destroyed a large part of the northern part of the city, in which there were some splendid buildings. However, many of them have been rebuilt already and new buildings are continually going up, there being a marked tendency nowadays to build of rubble masonry instead of wood, which is a constant menace in these hot climates.

“NOTABLE BUILDINGS.—The cathedral is situated in the principal square, and was begun to be built in 1620. This building consists of a spacious principal nave and four lateral ones, and it possesses a magnificent organ and notable pictures and images.

“The episcopal palace is situated on the north side of the cathedral park, and is a large, beautiful building of the renaissance style. Its façade is elegant and adorned by some fine moldings.

“The government palace is a solid and convenient edifice on the southern lateral coast of the mercado (market) cove. It faces the north and receives in consequence the breezes which come from that direction.

“The Grand Central Hotel, which is, without doubt, the finest of all the private structures, is situated in the cathedral park. It has four stories and occupies a quarter of a block.

“In the same square the Interoceanic Canal Company has its offices in another notable building of solid and elegant construction, modern style, and four stories.

“The municipal palace (city hall), a handsome edifice with

three tiers of galleries in its front and of considerable height, stands in Cathedral Park also. In its beautiful main hall the cabildo (city council) meets and the sessions of the departmental assembly are held. Other parts of the building are occupied by the Columbus Library and the offices of the city treasury.

CHARITABLE INSTITUTIONS.—“The department of charity is well attended to in the cities of Panama and Colon, which, being the most populous cities in the Isthmus, are the places where charitable institutions are most needed. In the city of Panama are situated the following:

“*Hospital of the canal company*.—This establishment, considered the best of its class in South America, was constructed on the best hygienic principles at the expense of the original canal company for the exclusive use of the employees and laborers in this colossal enterprise.

“It consists of 18 large rooms, and is attended by the Sisters of Charity. Each room contains 40 beds. It has a complete apothecary’s shop and, besides, a surgical room supplied with all the apparatus necessary in surgical operations.

“It occupies a charming position, dominating the city and the beautiful bay from the elevated position on the sides of Mount Ancon where it is built. It is surrounded by gardens, shade trees, and palms. The excessive heat which prevails in the city during the hottest months of summer is never felt here.

“*Foreign hospital*.—This hospital, also situated on Mount Ancon and built on the same hygienic principles as that of the canal company, was built under the auspices of the foreigners residing in the city, who contribute to its support. It has a capacity for 70 to 80 patients. Foreigners and sojourners can secure good treatment in this establishment by paying a certain sum, varying according to category and service required, but not generally exceeding \$1 per day.

“*Santo Tomas Hospital*.—This hospital is in the city and is a purely charitable institution. It is attended by Sisters of Charity and governed by a board of five members.

“The number of Sisters of Charity attending in the hospital is eleven, one acting as superior.

“*The pesthouse of Punta Mala*.—By this name is designated a house on the outskirts of the town where lepers are kept. This house is far from being a regular pesthouse, and this

fact is realized by the Government, which is making efforts to found one. For this purpose the decree of January 13, 1897, was issued, creating the leprosy board, composed of nine members, among them being two physicians.

“The total number of lepers in the department is 50, the number of cases in the province of Panama being 24, in Colon 24, in Chiriqui 1, and in Los Santos 1. There were only 23 cases in 1892, of which 18 were in the province of Panama and 5 in that of Colon. It is believed on good grounds that the great increase was not due to contagion or spontaneous contraction of the disease, but to the immigration of infected persons.

“*The Bolivar Asylum* (southern extremity of the Bocas del Toro highway).—The Bolivar Asylum is a purely charitable institution, founded in this city by the philanthropist, Gen. Tomás Herrera, and other gentlemen and distinguished Panamanian ladies. It is an institution of refuge for beggars principally, but its doors are open to all persons unable to earn a livelihood or temporarily out of employment, who here find shelter and food until they can improve their condition. It does not admit insane people or persons suffering from a contagious disease. It is sustained mainly by voluntary contributions, but also receives a certain quota from the profits of the Panama lottery. The establishment is spacious and well ventilated, and the service and sanitation are good. The average daily number of persons sheltered is calculated at 155.

“*Orphan Asylum of the Daughters of San Vicente de Paul*.—This institution, presided over by the Sisters of Charity, was founded in 1895 by the Rev. Mr. Parra, who is now bishop of Pamplona. He donated to it the building which it occupies. Children taken in here are given food, shelter, and a good Christian education.

“*Asylum of San José de Malambo*.—This is an establishment for orphans, founded by Mr. Manuel Jaén in 1889 and put in operation in 1890. It is a two-story building, is situated in an open, airy place, and can easily accommodate 50 children.

“*PROMENADES, ETC.*—One of the interesting promenades is the ascent to the top of Mount Ancon, which is 236 feet high, and from which a view of the whole city is commanded. When its summit is reached, the eye takes in the whole im-

mense Gulf of Panama and its pretty islands, as well as the Rio Grande throughout its whole extent. * * *

“All the environs of Panama are occupied by extensive and beautiful haciendas (farms), where the owners and farmers pass the hottest part of the summer, for which reason the country is crossed by paths and good roads, through some of which carriages can conveniently pass. * * *

“The nearest and most popular summer resorts are Sabanas, Taboga, Gorgona, Chorrera, El Valle, Anton, and many others. All these places have many clear brooks and enjoy an agreeable temperature. Provisions are also plentiful, and the milk is excellent and cheap. This is a valuable resource, for during the months of December, January, and February the heat renders living in the capital very trying.

“The means of reaching these summer resorts are cheap and easy. Taboga is one of the islands situated in front of the city, and is reached by sailing vessels in from one to four hours, according to the breeze blowing, while in steamboats hardly three-quarters of an hour are consumed in the trip.

“Sabana is reached in a carriage and Gorgona by rail, the latter place being situated at an elevated and agreeable point on the line.

“To La Chorrera, El Valle, Anton, and other towns of the interior the trip is made via the Pacific to the ports of La Chorrera, Capira, Chame, San Carlos, etc., and thence by bridle paths.”—*Directory of Panama, 1898.*

“Panama is a city of about 30,000 inhabitants. To the northeast of the city is located a small harbor, where small steam vessels and schooners may enter at high tide. A garrison of about 450 well-drilled Colombian troops is stationed in the cuartel in the “Plaza des Armas” in the city of Panama. These troops, commanded by a Colombian general, drill according to Upton’s tactics, and use the same bugle calls as those used by the United States Army.”—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

“Panama is $47\frac{1}{2}$ miles from Colon. Ample quarters; best at railroad station. Hospitals for more than 500. Best position for camp at railway yard and wharf. Ancon Hill dominates and commands all approaches. Usual garrison, 500

troops. Boat landing at railroad wharf or beach. Another landing at half tide at foot C. de Narino. One revenue cutter on Pacific coast. Rise and fall of tide, 15 to 22 feet.

"The time from Panama to New York is seven days; San Francisco about twenty days. There are two cable companies in the city, an electric-light plant, and an electric street-car line, which runs from one end of the city to the other.

"*Dívala*.—Dívala has an elevation of 538 feet and is situated near the west or right bank of the river of the same name.

"*David*.—David, 60 miles from the frontier, is the capital of the province of Chiriqui, contains about 9,000 inhabitants, possesses gold mines and numerous herds, and has excellent pasture lands. The elevation of David is 66 feet above the sea.

"*Santiago*.—At a distance of 190 miles from the frontier we touch the town of Santiago, the capital of the province of Veraguas. Santiago has a population of about 6,000 inhabitants, who are occupied with the extraction of gold, the raising of stock, and the fabrication of cotton and woolen goods. The town has an elevation of 302 feet above the sea.

"*Agua Dulce*.—Agua Dulce is a village in the Province of Coelé, the capital of which is Penonomé, with a population of about 15,000 inhabitants. The province possesses a very fertile soil, on which flourish large plantations of tobacco, cacao, and coffee.

"*Anton*.—Proceeding via Nata and crossing numerous streams almost at right angles, but on very nearly level ground, the town of Anton is attained at a distance of 248 miles from the assumed boundary.

"*San Carlos*.—The next important place touched is San Carlos, situated very near the Pacific Ocean, and belonging to the Province of Panama. Passing by Chamé, Capira, and the town of Chorrera, the city of Panama is finally reached at a distance of 334 miles from the Rio Golfito."—*Report of Intercontinental Railway Commission, 1891-93, Vol. I.*

"*Nata*.—Nata is one of the oldest settlements in America, dating from 1512, some time before the name of Mexico was known in Europe.

"*Bugaba*.—Bugaba, near David, is situated in the vicinity of the location of the old graves, full of gold ornaments, which, in 1860, gave the Chiriqui district a temporary renown as a new El Dorado."—*New York Sun*, November 15, 1903.

"*Bocas del Toro* is a thriving town rapidly coming into prominence as the point of export for a large district, rich in native products, and with an immense area of unoccupied land, suitable for the cultivation of cocoanuts, bananas, and other tropical fruits for which the demand is apparently a matter of constant growth.

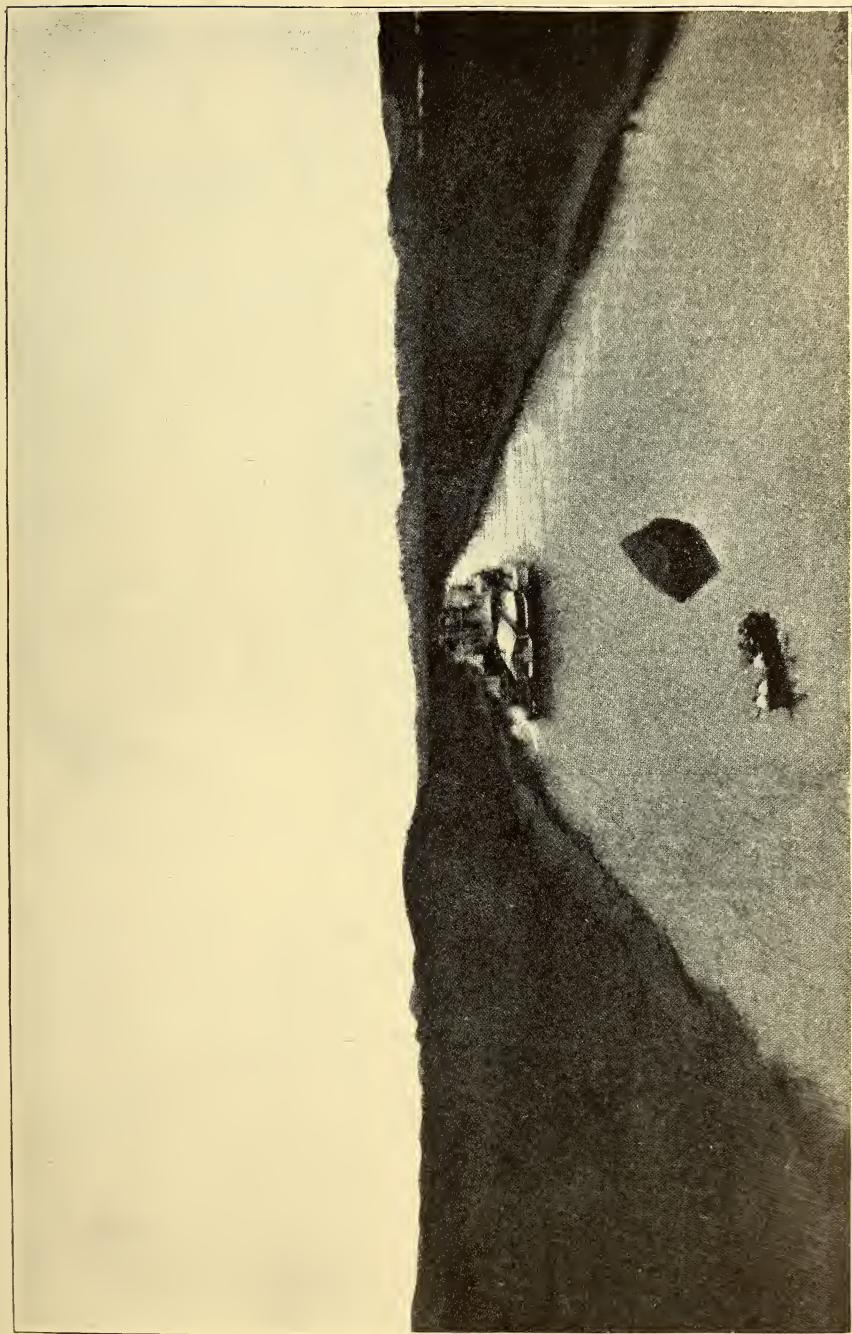
"Rice and sugar in the low lands and coffee and cocoa in the higher districts of the interior may also be cultivated to great profit and brought to this port by roads over a country which offers great facilities for cheap construction and easy maintenance.

"Although the population is made up to a considerable extent of natives of the West India Islands, who are British subjects, the export trade is entirely in American hands, and the import trade is chiefly American, with slight diversions in favor of Jamaica and Colon."—*Bulletin No. 33, Bureau of American Republics. British Consular Reports for 1890, Colombia*.

"**SAN BLAS DISTRICT.**—This district, situated to the north-east of Colon, at a distance of about 30 miles, which has not been opened to civilization or settlement—as the Indians inhabiting its coast and mountains are practically unconquered and openly hostile to Colombian rule—is but little known."—*Colombia. British Diplomatic and Consular Reports of Trade and Finance. Report for the year 1899 on the Trade of the District of Panama*.

(e) **LINES OF TRAVEL AND COMMUNICATION.**

CANALS.—"In 1878 the Colombian Government granted a concession for building the Panama Canal, and in the following year M. de Lesseps took the matter up. A company was organized, with a nominal capital of 600,000,000 francs (\$115,800,000), to be obtained by popular subscriptions in France, and the work of construction was begun in October, 1881. The canal was to follow much the same route as that of the railway from Colon to Panama. It was to be 54 miles in length, the bottom to lie 28 feet below the mean level of the oceans, the width to be 72 feet at bottom and 160 feet at



SCENE ON THE PANAMA CANAL.

top, except in the section through the Culebra Ridge, where the depth was to be 9 meters (29.52 feet), the bottom width 24 meters (78.91 feet), and the top width 28 meters (91.86 feet). The special difficulties to be encountered were the piercing of the Cordillera and the overflow of the Chagres River and its tributaries. In January, 1884, a little more than two years after beginning the work, but one-thirtieth of the excavation had been completed, although during 1883 a force of 11,000 men was employed. The cost of the work proved to be enormous, and much of the money, it was claimed, was wasted by extravagant management.

"According to the handbook of Colombia published by the Bureau of American Republics, the canal company had raised, up to June 30, 1886, the sum of 772,545,412 francs (\$149,101,264), or 172,545,412 francs (\$33,301,264) more than the original estimate, and it was then stated that nearly as much more would be required to complete the work. Finally, in March, 1899, work was stopped for want of funds, and provisional administrators were appointed by the French courts. Various schemes of reorganization were proposed, but little of actual importance was effected until 1894."—*Commercial Directory of the American Republics, 1897.*

"In 1894 a new company was formed, which obtained a concession for ten years, extended in 1900 by six years, so as to terminate in April, 1910. By that time the canal, according to the annual report of 1899, might be completed at a cost of 512,000,000 francs (\$20,480,000). On January 4, 1902, the board of the company offered to sell to the United States all their rights and property. In view of this offer the United States Isthmian Canal Commission recommended the Panama route, and on January 22, 1903, a treaty was signed whereby the United States obtains a lease of the necessary strip of land for one hundred years, renewable at the pleasure of the United States. The treaty between Great Britain and the United States, signed November 18 and ratified by the United States Senate December 16, 1901, provided for the neutralization of the interoceanic canal by whatever route it may be constructed and for its use on equal terms by vessels of all nations."—*The Statesman's Year Book, 1903.*

"The natural attractions of the Panama route lie in the combination of a very narrow isthmus with a low summit. The width of the Isthmus is less than 35 miles in a straight

line, while the summit is barely 300 feet above mean tide which, though higher than the Nicaragua summit, is less than half the height of any other which has been investigated. The high portion of the Isthmus is limited to a width of about 6 miles near the Pacific side, and the Chagres River affords access by canoe navigation to within 15 miles of the Pacific Ocean.

“The Isthmus here runs nearly east and west, but the course of the railroad or canal is from northwest to southeast, the Pacific terminus being about 20 miles farther east than the Atlantic. The Atlantic port is Colon, and the Pacific port Panama. Neither is a first-class harbor. The defect of Colon Harbor is its exposure to strong northerly winds, which, though rare, occur for periods of a few days every year, and while they prevail ships may go to sea for safety. Panama Harbor is a roadstead, behind islands, at the head of a great bay.

“The old Panama Canal Company, organized in 1879, projected a tide-level canal, 47 miles in length, between the two oceans. Five miles were in the coastal plain near Colon, 24 in the valley of the Chagres, 6 in the hills which form the divide, 7 in the valley of the Rio Grande, a small stream running from the hills into Panama Bay, and 5 in the harbor approaches. Two principal difficulties were encountered: The line of the valley of the Chagres involved an excavation below the bed of the river, which rises in the mountains east of Panama in a district subject to violent rains and at times floods its entire valley; the passage of the divide in the Culebra region involved an excavation of unprecedented dimensions.

“Before the stoppage of work by the old French company the scheme of a tide-level canal was abandoned, and various plans for a canal with locks were proposed, the summit level being placed at different heights, the highest being 160 feet above mean tide, to which high level it was proposed to pump the water. The new French company adopted a scheme in which the summit level of the canal is placed at a minimum elevation of $97\frac{1}{2}$ feet, approached by 4 locks in each direction, to be supplied with water from the upper Chagres, impounded by a dam at Alhajuela and brought through a conduit 10.4 miles to the canal at Obispo. By this arrangement the excavation in the continental divide was reduced within such limits that it was thought the work could be finished in eight years.

“By the construction of a dam across the Chagres at Bohio the river between that point and Obispo was converted into a lake of sufficient dimensions not to be seriously affected by flood discharges, while diversion channels were to be constructed on both sides of the canal from this dam to the sea. With a carefully designed system of sluices and controlling works the violence of the floods was to be checked by impounding the water both above the Alhajuela dam and in Lake Bohio, so as to keep the flow below the Bohio dam within the capacity of the two diversion channels. The adoption of this scheme by the French engineers in preference to a simpler plan, which was fully discussed by them, was determined by the limits of time to which the company was restricted. As the conditions would be different if the canal were constructed by the United States, the commission has adopted a simpler plan, avoiding complicated constructions like the conduit for the summit supply of water and making the regulation of the floods as nearly as possible automatic.

“With the change from the tide-level canal to a canal with locks, a third problem was added to the other two—the supply of water for the summit level. The only available source of supply is the Chagres River. This brings the water supply into such intimate relation with the control of the flood discharge that the two become practically one and must be treated together. The discharge of the Chagres at Bohio varies from a minimum of about 350 to a maximum of over 100,000 cubic feet per second, the extreme flood discharge being about 300 times the low-water discharge. The estimated requirement for the operation of the canal, with an annual traffic of 10,000,000 tons net register, is 1,067 cubic feet per second. The discharge of the Chagres exceeds this in some years for every month, and in all years, except for a short period in February, March, and April, provision must be made for the storage of enough water to supply the deficiency during these three dry months. The best storage place for this water is in the lake formed in the valley of the Chagres, making it of sufficient depth to allow the needed supply to be drawn off without lowering the level enough to impede navigation.

“The greatest flood of which there is any record occurred in 1879. From the imperfect information we have it has been

estimated that it may have reached a maximum discharge of 75,000 cubic feet per second at Gamboa, and 110,000 at Bohio. There is no record of any other flood in which the discharge at Bohio exceeded 80,000 cubic feet per second, while the floods in which it exceeds 50,000 are at such rare intervals that their effect on navigation would not be serious. The works should be so designed that a flood of 70,000 cubic feet per second would produce no currents which would interfere with navigation, the limit of such currents being fixed at 3 feet per second, and that a flood of twice this amount, or a discharge of 140,000 cubic feet per second, while it might temporarily suspend navigation, should not injure the structure of the canal.

“No location suitable for a dam exists on the Chagres River below Bohio, and while this location is not without difficulties it has the great advantage that about 3 miles southwest of the dam, near the head of the Rio Gigante, a tributary of the Chagres, there exists an excellent site for a spillway, by which the discharge from the lake could be kept well away from the dam and accessory works. The height of this spillway would regulate the height and area of the lake. After careful consideration the Commission has decided to fix this height at 85 feet above mean tide and to make the spillway in the form of a fixed weir 2,000 feet long. At elevation 85 the lake has an area of $38\frac{1}{2}$ square miles, more than 1,000,000,000 square feet. The height of $5\frac{1}{2}$ feet from the crest of the weir to the elevation required to pass the maximum discharge would represent the impounding of more than 6,000,000,000 cubic feet of water. While in the absence of complete data exact calculations can not be made, computations giving reasonably approximate results indicate that no flood has yet occurred which would raise the level of the lake more than a few inches above elevation 90.5 or create a discharge over the weir exceeding 89,000 cubic feet per second.

“The extreme possible effect, however, of a long-continued flood, with a discharge of 140,000 cubic feet per second, for which there is absolutely no precedent, as all great floods are of short duration, will be to raise the water over the spillway to elevation 92.5 and to produce a current of from 5 to 6 feet per second in the narrow parts of the lake. Calculations have been made of the amount of water required to supply the deficiencies in the three dry months. An assumption of a minimum average discharge of 630 cubic feet per second

for ninety days, which is the record of the driest year, gives an aggregate deficiency of 3,398,100,000 cubic feet below the required supply of 1,067 cubic feet per second, which corresponds to a depth of about 3 feet over the whole area of the lake. Under these extreme conditions the level of the lake might therefore be lowered to elevation 82. This represents a range of 8 feet from elevation 82 to elevation 90 in Lake Bohio during navigation. Any rise above 90 would mean nothing more than a swift current for a limited distance, and any fall below 82 would mean a temporary decrease in the depth of water in the canal.

"The overflow of Lake Bohio would discharge through the Giganta spillway into the Pena Blanca Swamp and thence into the Chagres near the point where the Chagres has abandoned its old channel and now flows through the canal excavation made by the old company. It is necessary to construct a new channel of large dimensions west of the canal to take the Chagres. An alternate plan would be to leave the present canal to carry off this water and construct the canal on a new location farther east. A feasible location has been found which, besides keeping the canal safely away from the Chagres, is $1\frac{1}{4}$ miles shorter than the original French line. The old location has, however, been retained in these estimates, the canal being enlarged to meet the new dimensions adopted by the Commission. This involves a new channel from the Marais de Peña Blanca to the Marais de Agua Clara and a continuous levee for 5 miles along the line of the canal.

"The canal, as thus projected, may be described as follows:

"The excavation begins at the 6-fathom line in the harbor of Colon, with a bottom width of 500 feet, and slopes of 1 on 3 through the bay and lowland 2.62 miles, of which about 1 mile is inside the shore line, forming a narrow, protected harbor. The estimated cost of this entrance and harbor is \$7,334,673.

"From the inner end of the harbor the bottom width of the canal is 150 feet, the side slopes of 1 on 3 being retained for 1.96 miles through the swamp, after which they are reduced to the standard used in firm earth. This level extends 12.56 miles to the Bohio locks. Its estimated cost is \$10,718,288. At Bohio is located a double flight of locks, having a total lift varying from 82 feet at the minimum level of the lake to 90 feet at the maximum, 45 to each lock, the normal lift being 85 feet. These locks are on the location adopted by the

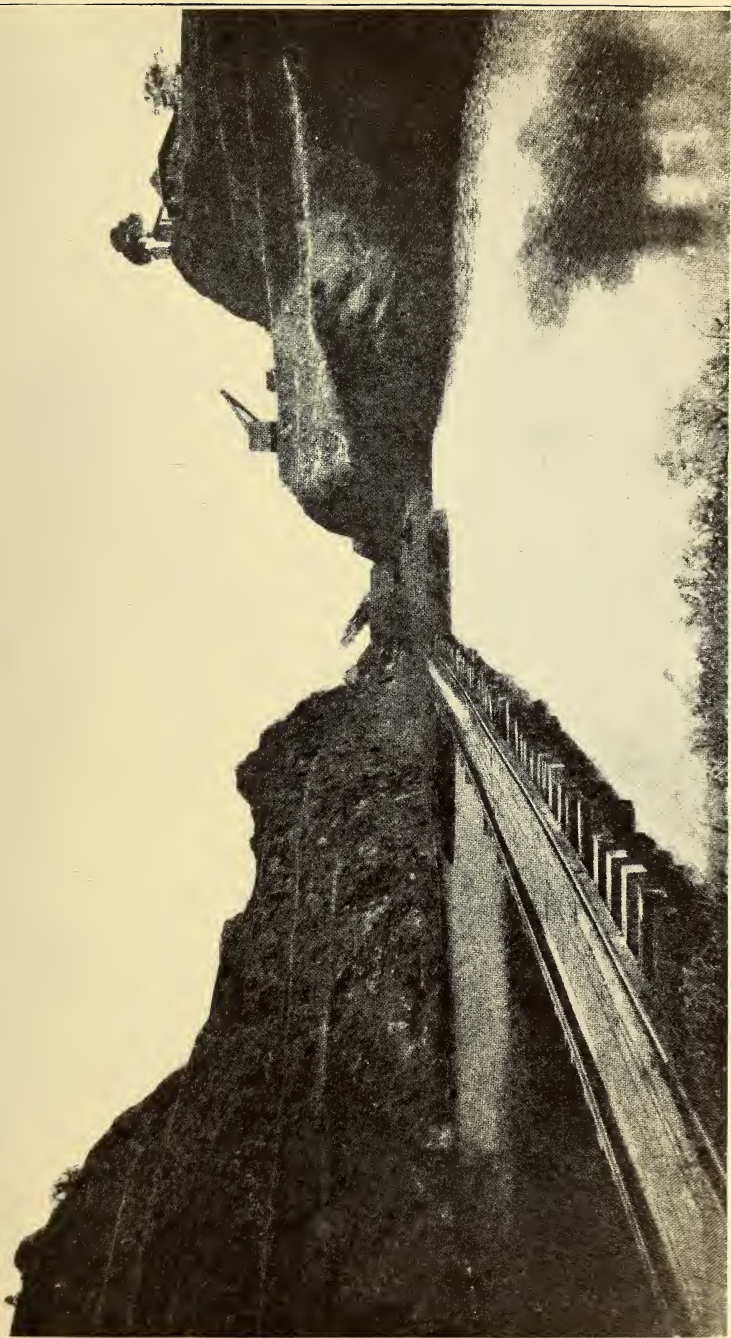
French company. The estimated cost of this flight of double locks, four lock chambers in all, is \$10,982,345.

"Above the locks the canal enters the artificial lake formed by the Bohio dam and known as Lake Bohio. For the first 7 miles it is a broad, deep body of water, affording room for anchorage as well as navigation. Beyond this some light excavations are necessary. At the upper end the channel would be enlarged to provide for the flood discharge of the Chagres, being given a minimum section of 50,000 square feet. The length of the channel in Lake Bohio is 12.59 miles from the locks to the point where it enters the cut through the divide. The estimated cost of this section is \$2,786,449.

"Near to the entrance to the summit cut would be placed a pair of gates 100 feet wide, so that if it should become necessary to draw off the water from the summit cut the level of Lake Bohio would not be affected. These gates would be at the site of a lock proposed by the French company, near Obispo, with a foundation on hard rock. The estimated cost of these gates is \$295,436.

"The summit cut is 7.95 miles long from the Obispo gates to the Pedro Miguel locks. The highest point is about 5 miles from the Obispo gates, where the bottom of the canal is 274 feet below the natural surface of the ground at the sides of the cutting. This is the famous Culebra cut, though the name has often been applied only to the mile of heaviest work. There is a little very hard rock at the eastern end of this section, and the western 2 miles are in ordinary materials. The remainder consists of a hard indurated clay, with some softer material at the top and some strata and dikes of hard rock. In fixing the price it must be rated as soft rock, but it must be given slopes equivalent to those in earth. This cut has been estimated on the basis of a bottom width of 150 feet with side slopes of one on one. While the cut may not be finished with this uniform slope, this furnishes as correct a basis of estimate as can now be arrived at. The entire cut would be lined with masonry walls, finishing at elevation 92, 2 feet above high water, these walls having nearly vertical faces and furnishing benches 38 feet wide on either side of the canal, on one of which the Panama Railroad would be laid, while it is probable that a service track would be placed on the other.

"Much has been said about the instability of the Culebra



PANAMA CANAL. CUT AT BAJO OBISPO.

cut. In point of fact, there is a clay in the upper portion of the deep cut which flows readily when saturated, but which will give little trouble if thoroughly drained; probably nine-tenths of the material would naturally be classed as hard clay of stable character. It would weather somewhat, and the surface might require some repairing with concrete in bad places, a practice common in deep cuttings in Europe. This clay disintegrates rapidly in water, and for this reason the canal prism should be confined between masonry walls. With the provision made for broad benches on each side, on which any slight slides would be arrested, it is confidently believed that no trouble would be experienced. The estimated cost of the 6.02 miles of heavy work is \$41,940,480, and of the entire 7.95 miles between the Obispo gates and the Pedro Miguel locks, \$44,378,335. It would probably take eight years to excavate this section of the canal.

"The Pedro Miguel locks will be similar to the Bohio locks, the aggregate lift varying from 54 to 62 feet. There is an excellent rock foundation here. The estimated cost of these locks, including an adjacent dam, is \$8,496,326.

"A level 1.33 miles long extends from the Pedro Miguel locks to the last lock, which is at Miraflores. The normal elevation of the surface of the water is 28. The estimated cost of this section is \$1,169,611.

"At the end of this level would be located the Miraflores Lock, with a lift varying from 18 feet at high tide to 38 feet at mean low tide. There is a good rock foundation for this lock. A spillway would be required to regulate the height of this level. The estimated cost of this lock and spillway is \$5,720,363.

"For 4.12 miles beyond the Miraflores Lock the canal extends through a low swamp country through which the Rio Grande runs. Occasional rock is found here, but the material is generally very soft, and the canal has been estimated for a bottom width of 150 feet, with slopes of 1 on 3. This brings the canal to a point known as La Boca, where the Panama Railroad Company has constructed a large and substantial wharf. A dredged channel 200 feet wide, with slopes of 1 on 3, would extend here 3.6 miles to the 8-fathom line in Panama Bay. The first 2 miles of this dredged channel are through flats which are bare at low water, where there is a considerable amount of submerged rock. The total cost of this section from the lock to deep water is estimated at \$12,366,914.

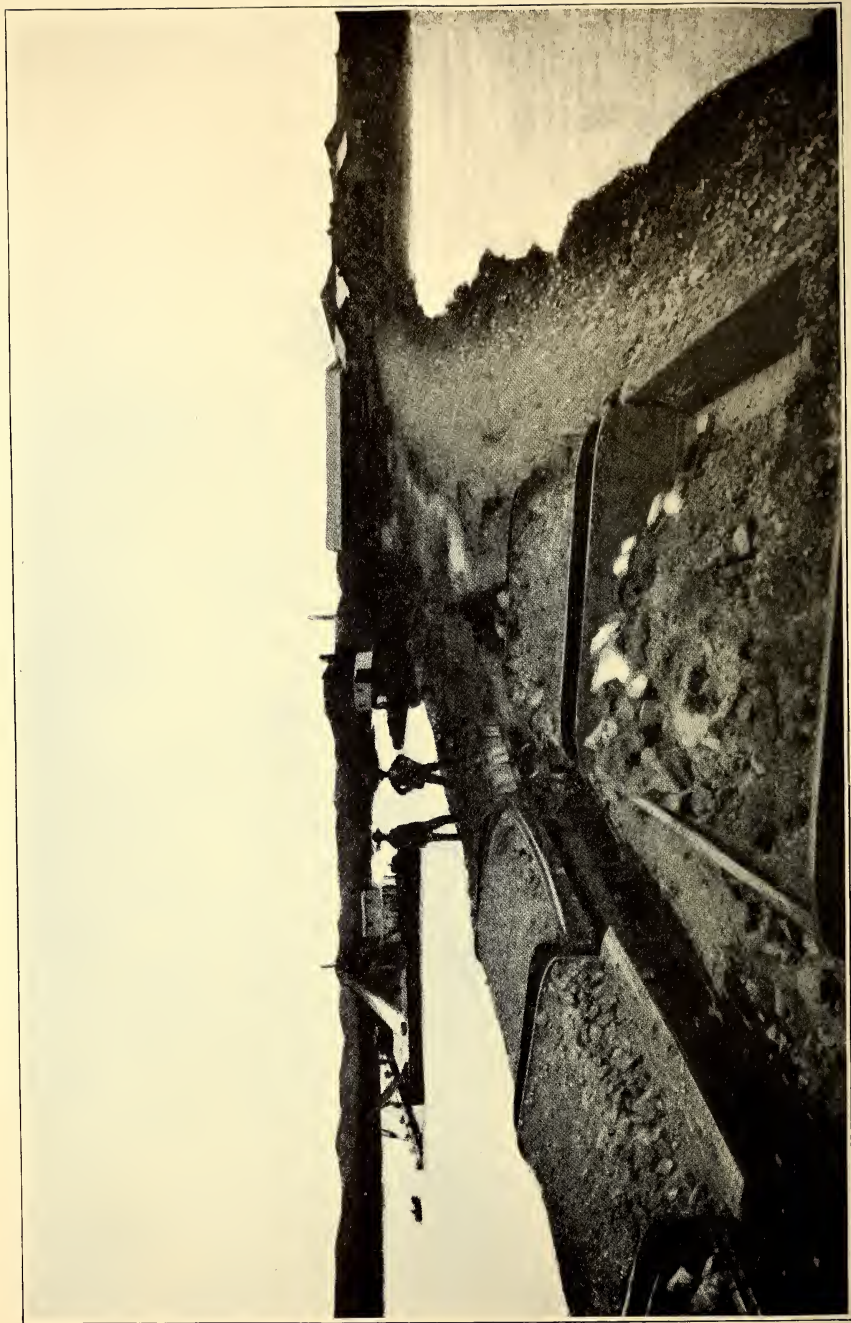
“Besides the works embraced in the excavation of the canal itself, there will be five outlying works which must be considered. These are the Bohio dam, the Gigante spillway, the diversion of the lower Chagres opposite Gatun, the diversion of the Gatuncillo east of Gatun, and the diversion of the Panama Railroad around Lake Bohio.

“The Bohio dam is the most important structure on the line. A dam of either earth or masonry is feasible, the latter being the more expensive. The French plan contemplates a dam of earth. It has been decided, however, to use the masonry type for the purpose of these estimates. The foundation must be carried to rock, the depth to which has not yet been estimated at all points, though the maximum is known to be not less than 128 feet below mean tide. The estimated cost of such a dam is \$8,500,000.

“The Gigante spillway, which is a structure of considerable magnitude, is very simple. There is a good rock foundation at or above tide level for the entire length of this spillway. It would consist of a masonry dam with a crest at elevation 85, terminating in an apron at elevation 65, with a solid foundation below this level, the apron being anywhere below the present surface of the ground. The foundation below elevation 65 would be put in first, and before the flow of water through the present river at the site of the Bohio dam is checked. The water after passing over this spillway would flow across the country about a mile to the swamp known as the Marais de Peña Blanca. The elevation of the surface of this swamp is now 22.3 feet, so that the water would have a fall of 42.7 feet in this mile, which fall would be materially reduced in extreme floods by the backing up of water in the swamp. Plans have been prepared for this spillway, and the estimated cost is \$1,124,524.

“A channel must be cut from the Marais de Peña Blanca to the Marais de Agua Clara, the cost of which is estimated at \$1,448,076.

“A channel was cut by the old canal company to divert the Chagres from the canal opposite Gatun. This channel, however, is of very inadequate dimensions, and a new channel, part of which will be an enlargement of the present one, should be cut here. It should have a cross section of 10,000 square feet. Rock would be encountered in its excavation, and its cost has been estimated at \$1,929,976.



MOLE EXTENDING FROM THE MAINLAND TO THE LARGE WHARF AT THE MOUTH OF THE PANAMA CANAL, ON THE PACIFIC.

"A diversion channel, intended to take part of the waters of the Chagres, was constructed by the old company along the east side of the canal at Boca Grande, back of Colon. This cut across the Gatuncillo near Gatun and the portion of it north of this point is available as a new channel for the Gatuncillo. Some work must be done on it, especially at the crossing of the Panama Railroad, where the piers for a new bridge are completed. The cost of putting this channel into service is estimated at \$100,000.

"From Bohio to the Obispo gates the Panama Railroad must be rebuilt for $15\frac{1}{2}$ miles on an entirely new location, with a bridge across the Chagres below Gamboa. An estimate made from approximate profiles indicates that the cost of this diversion will not exceed \$75,000 a mile, or \$1,162,500. From the Obispo gates the railroad would be carried for 6 miles on the bench formed by the retaining wall on the east side of the Culebra cut, these 6 miles being estimated to cost \$10,000 a mile, which includes only track laying, ties, and ballasting. Beyond this will be a mile of light work, estimated at \$25,000, while the main track will have to be raised for 2 miles farther, at a cost of \$20,000. Combining these figures, the total cost of the diversion of the Panama Railroad becomes \$1,267,500.

"Summing up the several figures already given, the total estimated cost of completing the Panama Canal is as follows:

Colon entrance and harbor	\$7,334,673
Harbor to Bohio locks, including levee.....	10,718,288
Bohio locks, including excavation	10,982,345
Lake Bohio	2,786,449
Obispo gates	295,436
Culebra section	44,378,335
Pedro Miguel locks, including excavation and dam.....	8,496,326
Pedro Miguel level	1,169,611
Miraflores locks, including excavation and spillway	5,720,363
Pacific level	12,366,914
Bohio dam	8,500,000
Gigante spillway	1,124,524
Channel between the marshes	1,448,076
Chagres diversion	1,929,976
Gatuncillo diversion	100,000
Panama Railroad diversion	1,267,500
<hr/>	
Total	118,618,816
Engineering, police, sanitation, and general contingencies..	23,723,763
<hr/>	
Aggregate	142,342,579

"This estimate is for the completed project. A canal begun upon this plan may be opened to navigation before its final completion. If single instead of double locks be used, and the bottom width be made 100 instead of 150 feet, the cost will be reduced \$26,401,364, and the estimate becomes \$115,941,215.—*Interoceanic Canal, Senate Report 1337, part 4, 1901.*

"A canal is being built from the Chanquinola River, about 18 miles from Bocas del Toro, to Almirante Bay, opposite Bocas de Drago, the concessionnaire of which is Mr. N. T. Snyder, the owner of nearly 4,000 acres of banana land in Chanquinola. This canal is about 8 miles in length, and will open to commerce a wide area of the richest banana country in the world, of which about 6,000 acres are already cultivated and bearing fruit.—*Commercial Relations, 1902.*

"WATER TRANSPORTATION.—The port of Panama, situated on the west side of the bay of that name and located at one of the most interesting geographical positions in the Americas, if not of the world, is of the greatest importance. It is a halfway station on the highway of commerce between Europe and Asia, yet it has no direct line to the Asiatic ports. By the way of Colon and the Panama Railroad it is connected with Europe and with the eastern part of the United States by many steamship lines, to wit: The Royal Mail Steamship Company (mail line, British); The Royal Mail Steamship Company (cargo line, British); Compagnie Générale Transatlantique, of Saint-Nazaire (French); Compagnie Générale Transatlantique, of Havre and Bordeaux (French); Compagnie Générale Transatlantique, of Marseilles (French); West Indies and Pacific Steamship Company, of Liverpool (British); The Harrison Line, of Liverpool (British); Hamburg-American Packet Company, of Havre and Hamburg (German); The Colombian Line, of New York (old Pacific Mail Steamship Company, United States); Compañía Transatlántica, of Barcelona (Spanish); The Italian Line, of Genoa (Italian). The fleets of these companies aggregate some 65 vessels, some of which are among the finest sailing across the ocean.

"*South American Steamship Company.*—This company has steamers leaving this port every other week bound for Chile, the termini being Panama and Valparaiso, a distance of something over 3,000 miles. The itinerary of the line is as fol-

lows: Buenaventura, Tumaco, Esmeraldas, Nahia, Manta, Cayo, Bellenita, Guayaquil, Tumbes, Payta, Techura, Pimentel, Eten, Pacasmayo, Selaverry, Chimbote, Samanco, Casma, Huarmey, Supe, Huacho, Callao, Corro Azul, Tambo de Moro, Pisco, Lomas, Chala, Quilca, Mollendo, Ilo, Arica, Iquique, Tocopacilla, Tobija, Antofagasta, Taltal, Chanaral, Caldera, Carrizal Bajo, Huasco, Coquimbo, Valparaiso. The steamers of this line call at all of these places. The regular ports of call for the largest steamers are Guayaquil, Techura, Pimentel, Callao, Mollendo, Iquique, and Coquimbo. The distance from Panama to Guayaquil is 800 miles; from Guayaquil to Callao, 600 miles; from Callao to Iquique, 650 miles, and from Iquique to Valparaiso, 800 miles. This company secures its coal from Corral, some 400 miles south of Valparaiso, where splendid coal deposits are found.

“The fleet of this line is composed of the following vessels:

Steamers.	Capacity.	Horse-power.	Steamers.	Capacity.	Horse-power.
	<i>Tons.</i>			<i>Tons.</i>	
Aconcagua.....	3,000	3,100	Limari	900	650
Imperial.....	3,000	3,000	Chillan	600	450
Mapocho.....	3,000	3,000	Biobio	600	400
Maipo.....	2,950	2,000	Spartan	600	400
Cachapoal.....	2,755	1,900	Aquila.....	600	400
Lantara.....	2,600	1,600	Lircai.....	600	400
Amazones.....	2,500	1,800	Longavi.....	400	370
Itata.....	2,600	1,500	Maule.....	250	240
Copiapó.....	1,800	1,900	Pudeto.....	300	230

“Only the largest of these vessels come to this port, viz, the *Aconcagua*, *Imperial*, *Mapocho*, *Maipo*, and *Cachapoal*. The other steamers, especially the small ones, do coastwise service and ascend the rivers as far as possible, so that from Valparaiso to Panama there is not a port of importance in Chile, Peru, and Ecuador that can not be reached by one of these vessels.

“The passenger (first-class) rates are, from Panama to Guayaquil, £13 15s. (\$66.81); from Guayaquil to Callao, £20 (\$97.32); from Callao to Valparaiso, £11 17s. 6d. (\$57.79); from Panama to Valparaiso, £31 17s. 6d. (\$154.63).

“The rates to all intermediate points are somewhat proportional to distance. The passenger traffic is considerable both ways. The line is controlled by Chilean capitalists.

“*The Pacific Steam Navigation Company*.—This is an English corporation (limited), with headquarters in Liverpool. It runs steamers all over the world, but has a distinct line

doing service with Valparaiso, from which port it runs a special line of steamers to Panama. The fleet is composed as follows:

Steamers.	Capacity.	Horse-power.	Steamers.	Capacity.	Horse-power.
	<i>Tons.</i>			<i>Tons.</i>	
Arequipa	3,190	2,600	Pizarro	2,160	1,900
Bolivia	1,925	1,800	Quito	1,266	1,100
Coquimbo	1,821	1,600	Santiago	3,190	2,800
Casma	592	450	Serena	2,394	2,100
Manavi	1,041	900	Morro	170	150
Puno	2,398	2,200			

"These steamers make trips fortnightly regularly and work somewhat in conjunction with the South American Steamship Company, although they are distinct lines under different managements. There was a time, not so very long ago, when they ran a powerful competition, but they have pooled their issues.

"The termini of this particular line are Valparaiso and Panama, but it runs a steamer regularly to Puntas Arenas and back, principally for the cattle business. The itinerary of this company is identical with that of the South American Steamship Company. The rates for passengers (first class) from Valparaiso to this place and intermediate points, and vice versa, are identical with those of the same company, as are the rates of freight.

"This company owns in the Bay of Panama an island called the "Little Toboga," leased from the owner for a number of years. On this island they have waterworks, which furnish them all needed water (spring) for their steamers. They maintain in this bay a small steamer called the *Morro*, of 170 tons, to supply their vessels with water. This lease is exceedingly valuable, as the water is excellent and, so far as known, the only spring water in this part of the world.

"*North American Navigation Company.*—This company has a fleet composed of the following vessels:

Steamers.	Capacity.	Horse-power.
	<i>Tons.</i>	
St. Paul	606.61	400
Mexico	1,240.72	700
Keweenaw	2,511.40	2,000
Saturn	2,268.15	1,900
Progreso	1,919.13	1,700

“This company was organized early in 1893 in San Francisco by some of the leading merchants of that place, in opposition to the Pacific Mail Steamship Company. It operates in conjunction with the Panama Railroad, through bills of lading being given from San Francisco direct to New York via Panama and Colon, and vice versa. All the vessels are chartered from eastern parties for the term of one year, and the line is controlled by Capt. W. L. Merry, president of the company, with general offices in San Francisco.

“It has no accommodations for passengers (first class) and does not pretend to carry any, unless upon exceptional occasions, and then only as deck passengers. It carries a large amount of freight both from San Francisco to Panama, and vice versa. It broke the monopoly which the Pacific Mail Steamship Company had enjoyed on this coast for many years. The trips are somewhat irregular, there being no fixed dates for arrivals or departures, but so far they have averaged two trips per month each way. The rates of freight, owing to the competition with the Pacific Mail Steamship Company, are very low and irregular. They charge what they can get—sometimes less than a cent per pound, often only \$2 per ton.

“The ships of the North American Navigation Company make the trips direct from here to San Francisco and return, calling on rare occasions at Mexican and Central American ports. The distance from San Francisco to Panama is 3,940 miles.

“*The Pacific Mail Steamship Company.*—This company has been supplying service between San Francisco, the Isthmus, and New York for nearly half a century. It is not as powerful in these regions as it once was, but promises ere long, if all signs do not fail, more than to regain its former usefulness and greatness. It is doubtful if it will ever have a foothold south of Panama, nor does it seem to care for any. In fact, it has not protected its own coastwise trade north of Panama, as it has allowed the Pacific Steam Navigation Company (British) to encroach on its domain, that line now having a steamer doing service at the expense of the Pacific Mail as far north as Puntas Arenas, in Costa Rica. This service promises not to stop there, and it would not be surprising to see the Pacific Steam Navigation Company steam all the way to San Fran-

cisco, unless the Pacific Mail gives much better service than it now gives.

"The fleet of the Pacific Mail Steamship Company on this route consists of the following vessels:

Steamers.	Capacity.	Horse-power.	Steamers.	Capacity.	Horse-power.
	<i>Tons.</i>			<i>Tons.</i>	
Colon	1,843.50	1,700	City of Sydney	1,965.88	1,800
San José	1,538.25	1,450.50	Costa Rica	1,166.80	900
Acapulco	1,759.24	1,600	Starbuck	1,548.41	1,000
San Blas	1,496.50	1,300	City of Panama	1,046.30	800
San Juan	1,496.50	1,350	Barracouta (Brit.) ..	1,659	1,400
Colima	2,143.23	2,000			

"The last four are doing coasting service as far up as Acapulco. They do not go to San Francisco. The itinerary of the company is as follows: Puntas Arenas, San Juan del Sur, Corinto, Amapala, La Union, La Libertad, Acajutla, San José de Guatemala, Champerico, Ocos, San Benito, Tonalá, Salina Cruz, Puerto Angel, Acapulco, Manzanillo, San Blas, Mazatlan, and San Francisco.

"The main points and their distances from Panama are: Corinto, 740 miles; San José de Guatemala, 990; Acapulco, 1,590; Manzanillo, 2,140; San Blas, 2,225. The distance between Panama and San Francisco is 3,920 miles.

"When the coffee ceases to move, one of the coasters is withdrawn from the route, and it then serves as a coal ship in the Bay of Panama.

"The *Barracouta* sails under the English flag.

"Three steamers leave San Francisco for Panama—on the 8th, 18th, and 28th of each month. They return from Panama to San Francisco on the 9th, 19th, and 29th of each month. The coasters leave Panama on the 10th and 29th of each month, and they aim to make about one trip per month for each vessel, but this is not very regular, owing to the difficulties in loading and unloading at the different places in Central America and Mexico, the system of lighterage being in vogue at almost all these ports, there being no piers.—*Commercial Directory of the American Republics, 1897-98.*

"In 1901-2 on the Pacific coast the steamship lines engaged in the isthmian transit trade were (1) the Pacific Mail Steamship Company (American) from San Francisco, Mexican, and Central American ports; (2) the Pacific Steam Navigation Company (British); (3) the Campaña Sud Americana de

Vapores (Chilean) from Valparaiso and other Chilean ports, Peru, Ecuador, and Colombia.

"On the Atlantic coast trading to Colon are (1) the Royal Mail Steam Packet Company from Southampton and the Leyland and Harrison Line from Liverpool, both representing British trade; (3) the Campagnie Générale Transatlantique from Havre, Bordeaux, and St. Nazaire, representing the French trade; (4) the Hamburg-American Line from Hamburg, representing the German trade; (5) the Campaña Transatlantica de Barcelona from Barcelona, representing the Spanish trade; (6) the Panama Railroad Company's Steamship Line from New York, representing the United States trade.—*Monthly Bulletin of the Bureau of American Republics, August, 1903.*

"ROADS.—The country between Panama and "Panama Viejo" is very rolling and grown with grass, affording fine pasturage for cattle. Along this road the country would also afford excellent camping facilities for large bodies of troops. The water supply of Panama at the present time is very poor, the only good water being stored in cisterns in the city. Water is also drawn from wells along the railroad near the city, but this is exceedingly impure.—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

"The Sabana road, leading out of Panama, near railroad station, forks a short distance outside of town. The east branch leads to Puerto Bello, the other to Cruces and Gorgona. From the latter, just east of Cardenas River, $4\frac{1}{2}$ miles from Panama, a path leads off westward to Chorrero, crossing the old line of railway between Pedro Miguel and Rio Grande stations, then up the left bank of the Rio Grande above canal and railroad. One and one-half miles northeast of the Rio Grande station the Cruces-Gorgona road forks, one branch leading to each village. That to Cruces does not again approach the railroad, but terminates in the valley of upper Chagres at Cruces. The Gorgona road beyond the fork crosses the railroad two-thirds mile northwest of Empire and continues to Gorgona, about one-half mile distant from the west side of railroad. A trail continues to Matachin. A trail leaves the Cruces-Panama road a short distance south of Cruces and crosses the railroad one-fourth mile south of Obispo station. It crosses the Gorgona road about 1 mile northward of where the latter crosses the railroad.

“SAN MIGUEL REGION.—The line of our survey from Panama was along the mule trail to Chepo; for the first few miles over a moderately rolling and mostly open country, thence to Juan Diaz River, skirting or crossing the foothills from the central range, from the sloping plain rather, the occasional flat ground heavily timbered and mucky in parts from the late rains.

“From the Juan Diaz to the Pacora pretty much the same. The axial cordillera does not run out spurs to the Pacific. Those spurs range only a short distance from the main mass—wooded, their declivities at an arable pitch—and sink into a very moderately sloping plain apparently 12 to 15 miles wide. The line of the trail is three-fourths in open prairie. Many large hard-wood trees in the forest. The subsoil a red or reddish yellow, loamy clay, underlain by massive clay rock—that is to say, rock in thick beds—solidified shale, as packets of mouth glue becomes solidified. It is a better country than that passed by us between David and Panama—than the last 200 miles of it, at least; better soiled and timbered. The wide plain above noted, bountifully watered by perennial streams, is really, because of erosion, a series of hardly ridges except here and there, but heaves or spits, turtle-backed, generally open grass land, inclined just right for drainage and merging in a flat, adjacent to the sea, 3 or 4 miles wide, composed of the fine wash from the upland and heavily wooded. We found it hard baked and sun-cracked wherever bare of grass. There was a continuous crack 2 to 4 inches in width along the middle of every trodden path, however it might wind or jog. The petrified hoof holes showed it to be soft in the rainy season.

“From Pacora the trail ran northeastward in order to get uphill and follow a ridge crest. Thence across a rolling tract watered by affluents of Rio Chico it won the village of Chepo.

“Chepo village is on high ground, healthful, and free from insects.

“We studied the coast attentively down to San Miguel Bay, there, as farther east, observing that it was characterized by sea plain and knolls or short ridges, both isolated and in clusters, quite detached from the cordillera except at the Chiman. From our night's anchorage at the mouth of Rio Trinidad we discovered a saddle in the spur above Chi-

man village permitting transit from that river southeastward. At San Miguel Bay the surprise awaited us of finding a clear vista northwestward up Congo River toward Chiman, and that the hills between Buenaventura and Punta Brava were outstanding, an unexpected event.

"On the northern side of San Miguel Bay no obstacle appeared. A depression in the low ridge dividing Darien Harbor from the estuary of the Savana River admitted the proposed railroad line to a crossing of that stream, which we selected 5 miles below its confluence with the Lara, after an exploration by canoe.

"The section at high tide was as follows: Beginning on fast ground west side, thence 600 feet of mangrove thicket, depth of water gradually increasing to 10 feet; thence 1,000 feet, deepening to 40 feet; thence 300 feet, shoaling to 35 feet; thence 100 feet, shoaling to mangrove swamp awash; thence 500 feet flat to fast ground on east side. Mean range of tides, about 15 feet. Bottom bluish mud, into which, at the river margin, we were unable to churn down a sharp and heavy pole more than 15 feet. Commander Eastman remarks, concerning this estuary, that the bottom is generally mud, a few exceptions of rock and gravel, but that 10 feet under the mud rock would probably be found.

"From Rio Chico southward the greater portion of the proposed railway line would pass through forest, probably full half of it would be in forest between Panama and Yavisa."—*Report of the Intercontinental Railway Commission, Vol. II.*

"DAVID TO PANAMA.—We resumed field work at David Saturday, January 21, 1893, and, by way of the public trail, generally used as a thoroughfare through San Lorenzo, San Felix, Tolé, La Mesa, Santiago, Aguadulce, San Carlos, Chame, Capira, and Chorrera, arrived at the railroad station in Panama Thursday, February 16, a distance of 292 miles from the start.

"The trail on the whole is fairly direct, but in detail devious and sometimes tortuous, seeking to traverse detached ranges of settlement on the sabanas and ridge-crest passages between them through the forest.

"The Isthmus on the Pacific side, from David to Panama, may be topographically summarized as mountains, sloping plain, and sea flat. The mountain rose first. The plain was

derived mainly from it and spread out under water. The sea flat was similarly derived from the plain after its emergence and built up in the coast shallows above tide level.

“This uniform make is interrupted by spurs from the cordillera at Tolé and La Mesa and by the approach of the cordillera itself to the Pacific near Capira. The plain, too, has been defeatured by erosion and is masked to some extent by lofty hummocks and hogbacks, fragments of the ancient mountain mass.

“The geology is variegated clay, red or ruddy yellow at the surface, gray below, underlaid by shale in massive beds, weathering black where exposed.

“The country is watered by numerous streams, almost without exception clear, lively, stony bedded, and firm banked. Timber for railroad use is abundant. The same may be said of stone for masonry if concrete be included in that item. Material for dry walls is scarce.

“Perhaps those who shall utilize our work hereafter would be best served by more particular sketch of our observations.

“From David to Rio Chorecha the line is nearly all in prairie, well populated by native Indians. It passes through forest only at the stream crossings, but the prairies themselves—various in width and a little undulated lengthwise—are lakes of grass, bordered by irregular shores of forest, so that the view was bounded by woods on every hand as we went along.

“Between Choreca and Boca del Monte the trail held the crest of a sharply serrate ridge in close wilderness, with undergrowth of palms and platanitos, issuing at the latter point on ridge prairies, which extended thence in widening and declining expanses to level plain at San Lorenzo.

“Between the rivers Fonesca and Tupi the topography is irregular and hummocky. There is prairie for about 2 miles approaching Rio San Juan and for about 5 or 6 miles approaching Rio Viejo.

“From the vicinity of Remedios to that of Tolé another jagged profile through forest exists on the line of the trail, ending in sharp ascent.

“Between Callejon Summit and Rio Cobre the country is comparatively rough and uninhabited.

“La Mesa, as the name implies, is seated on a high plain, which declines very slowly eastward and drops off at the end so fast as to necessitate a little development [for railroad

location] near the Vacoi. Thence toward Santiago, crossing affluents of the San Pedro in a wide, scrubby flat, another marked characteristic of the Pacific plain is found. Near all those tributary channels the surface was pitted by rainfall over considerable spaces, 10 to 15 feet deep. The harder layers being cemented by some solution of iron, those pitted areas had the exact likeness of hematite ore diggings.

"From Santiago a wide swell of grassy plain, drained right and left, carried us by imperceptible descent to the Rio Santa Maria. Thence to Aguadulce there were long reaches of low undulation, with shallow, dead flat, lake-like basins on either hand around which the trail detoured. A dark-green water weed covered them, showing that they might be ponds during the rainy reason.

"From Aguadulce the trail bore northeastward to Nata, passing to the left of an outlying clump of hills.

"Arrived over easy ground at Anton; we followed the trail to the beach and the beach to San Carlos; had not tide prevented would have followed it to the vicinity of Chame to make speed. It is the usual highway when tide permits. Much of the land along this part of the coast bluffs into the sea—clay bluffs 50 to 80 feet high, containing beds of rounded cobbles, and shingle cemented with clay, and standing vertical or nearly so.

"Capira Mountain, south of the river so named, is approached by way of a series of low saddles in spurs from the main cordillera. It necessitates an ascent of 550 feet and a descent of 331 feet to a crossing of the river. It exposes beds of clay rock harder than that found farther west, and is cumbered with blocks of the same material and bowlders of volcanic origin. Heavy timber reappears in this locality.

"It is plain going from Capira River to Chorrera.

"Future expeditionary parties for survey between Punta Arenas and the Atrato country should be so timed, manned, and distributed as to complete the work in the summer season, say December to March, inclusive. This allows the month of November for drying the ground and carries nearly to the end of fair weather. Even in January and February we encountered hog wallows barely passable—some not passable—necessitating tedious detours. A few days' rain would have the effect of seriously impeding, if not actually blocking, field work. This memorandum is of great importance.

"The river Santa Maria flows eastward into the Gulf of Parita through a wide valley, receiving its principal tributaries from the southern slope of the cordillera. The Rio Grande, its neighbor eastwardly, appeared to draw its supplies direct from the interior of the Isthmus, which in that quarter looked much broken, hummocky, and comparatively low.

"Between Nata and Chame the oxhorn thorn abounded. It is chestnut-brown in color. Twin thorns alternate, 1 inch apart, on the stems and twigs of a shrub thinly foliaged, its leaves similar to those of the honey locust. The most perfect thorns have a height of $1\frac{3}{4}$ inches, a spread of $2\frac{3}{4}$ inches, and taper continuously on curved lines from an elliptic section at their juncture half an inch wide and a quarter deep. They curiously justify the name given them. Near the points a small hole is found in each thorn, permitting the passage of little reddish ants, who first consume the pith filling of the thorns and then inhabit the hollow. They discriminate unerringly between the push of the wind and that of hand, paw, or claw, and swarm out promptly to repel the intruder. Their bite is instant, multitudinous, and hot—somewhat like nettle sting, but the pain does not last long.

"In that same region, on saucered plains annually ponded by rain, were numerous abandoned ant hills, as we supposed, of a light granite-gray, having the appearance of cemetery monuments. They range from low cones 4 to 6 feet in diameter at the base and 2 feet high, through every variety, concave and convex in outline, of low cone surmounted by peaky cusp, the larger ones rising to heights of 8 and 10 feet above ground.

"Our march along the seaside between Anton and San Carlos was enlivened by the great company of pelicans—sometimes at rest on bowldery jetties, sometimes on the water, all of them taking wing when a shoal of fish appeared.

"The plains of Chame are of gray and white clay with disseminated shingle and cobbles, large beds of them scattered about. The surface of the country is clawed by drainage as if by spread fingers of an enormous hand struck in and gradually drawing together. The general surface is about 100 feet above the channels of the larger streams. Mist flowers were in blossom there, and morning glories, crimson, white, blue, and yellow, together with compound tints;

oxhorn thorns a plenty. Also climbing ferns, with very delicate little fronds, festooned the trees or hung withered in long tassels. North winds from the Caribbean Sea blew gusty during the forenoon. They were slackened in the afternoon by counter-currents from the Pacific, but prevailed again in the evening. The plains are diversified by islands and capes of low forest. There are few settlers between the Chame villages and Chorrera. The latter place is a summer resort about 20 miles from Panama—the largest town on our line between David and that city—its population a motley of Spanish, Indian, and negro.

“Approaching Panama we found many Jamaica negroes stranded by abandonment of work on the canal. Some of them were charcoal makers, others market gardeners; most of them ugly featured and rather surly in expression, but civil in speech and bearing, and in appearance thrifty.”—*Report of the Intercontinental Railway Commission, 1891–1893, Volume II.*

RAILROADS—*The Panama Railroad.*—“Mr. William Aspinwall and others obtained a charter from the State of New York on April 7, 1849, and undertook the construction of the Colon-Panama Railroad. The undertaking was beset by numerous difficulties, the more serious of which were the existence at the Atlantic end of some 6 miles of continuous swamp which had to be ballasted, the relatively high altitude of the Culebra Pass, over which the line was carried, and the prevalence of landslides at this latter point. Work was commenced toward the end of 1850, and it took the pioneers fully two years to complete barely 23 miles of road. Two years later they had advanced 20 miles farther to the Culebra Pass, and on January 27, 1855, the line was completed and inaugurated. Altogether its cost was some £1,600,000, or approximately £34,000 per mile.

“The concession granted to the company and the contract entered into between them and the Colombian Government in 1850 was, on August 16, 1867, or nearly thirteen years subsequent to the completion of the line, superseded by those under which the company is now working. By the terms of the present agreements the Colombian Government concedes to the company exclusive privilege for a term of ninety-nine years (expiring August 16, 1966) a practical monopoly of all roads across the Isthmus, the cession in perpetuity of 158,144

acres of waste lands (to be increased to 237,216 acres, if that quantity be disposable within the limits of the ancient provinces of Veraguas and Panama), the exemption of its properties from taxes of all and every description. In return for these concessions the company bound itself to pay the Colombian Government a sum of \$1,000,000 purchase money and an annual contribution of \$250,000, to transport gratuitously all national troops, equipage, arms, mails, and State-protected immigrants to the number of 2,000 per annum. At the expiration of the concession in 1896 the entire plant and annexes become State property. All the conditions of the concessions have been strictly observed.

“The company’s plant consists of 26 road and 11 switch engines; 5 special, 8 first-class, 16 second-class, and 7 baggage cars; 580 box, 136 coal, and 183 flat freight cars; 57 other cars of various descriptions, 1 movable steam crane, and a pile driver; 3 steamships, with an average burden of 2,730 tons apiece; 3 steam tugs, and 24 lighters, with adequate mole and pier accommodation at both Colon and Panama; offices, stores, workshops, and a number of other edifices.

“The company has contracted to erect at a cost of \$1,000,000 a pier at the mouth of the river Grande, the Pacific outlet of the canal, a short distance to the west of Panama, with a view to permit the loading and unloading of cargo directly from a vessel to the cars. Dredging operations are being executed at this point, and with the removal of about 106,000 cubic feet of solid rock the channel leading up to the projected mole will be deep enough to admit the entry of such ocean-going ships as at present call in at this port. It is expected that the mole will be completed and open to traffic during the latter part of 1898. The actual size, 984 feet by 52½ feet, is wholly inadequate for present traffic, and when, as is asserted, only the open-sea side will be available for shipping, its value and importance sink into insignificance.”—*Colombia, British Diplomatic and Consular Reports, 1896.*

BY RAIL FROM PANAMA TO COLON.—“The Panama Railroad has American rolling stock, 5 feet gage, and is a first-class line. All the engines and cars were manufactured in the United States.

“The railroad runs in a general northeasterly direction from Panama to the station of Corozal, 3.03 miles distant,

through a mangrove swamp. The capacity of the railroad siding at this station is 44 cars.

"From Corozal all the way to Culebra Station the railroad runs up grade.

"The next station, Rio Grande, is $4\frac{1}{4}$ miles from Panama, and has no railroad siding whatever. The number of inhabitants, about 75, are principally Jamaica negroes.

"The next station of Miraflores is 5.5 miles from Panama, and has a railroad sidetrack, with capacity of 55 cars. Population, about 100, principally Jamaica negroes and Chinese.

"The next station, Pedro Miguel, is $6\frac{1}{3}$ miles from Panama, and has a sidetrack capacity of 24 cars, also a good railroad water tank.

"The next station, Paraiso, 8 miles from Panama, is a place of probably 250 inhabitants, principally Jamaica negroes and Chinese.

"The next station of importance is Culebra, 11.2 miles from the city of Panama. Railroad sidetrack capacity at this place, 33 cars.

"The railroad company have a branch track running from near the railroad station, through Culebra Cut, along the canal, about 2 miles south.

"Near Culebra Cut about 200 frame houses are located, with corrugated iron roofs, belonging to the French Canal Company.

"At Culebra and at Empire, about $1\frac{1}{2}$ miles north, the French Canal Company are at present working a force of about 900 Jamaica negroes on the canal line.

"Empire is a station 12.75 miles from Panama, having a side track along the railroad with a capacity of 45 cars. The French Canal Company also own about 50 frame houses, with galvanized roofs, where live the Jamaica negroes who are working upon the canal. The population is about 4,000.

"Near the town of Empire, about 400 yards east of the railroad station, is a hill about 251 feet in height, which is well intrenched and which was used by the revolutionists during the recent insurrection against Colombia to hinder the advance of the Government troops in their advance from Colon to Panama. A very strong defense was made by the revolutionists at this place.

"Las Cascadas, about $14\frac{1}{2}$ miles from Panama, has a side

track of 36 cars and several large machine storehouses, belonging to the French Canal Company. Population about 400, principally Jamaica negroes and Chinese.

"Bas Obispo, the next station, is about 16.5 miles from Panama, with a side-track capacity of 9 cars. The number of inhabitants is about 200. At this point are also located a number of machine storehouses and frame houses belonging to the French Canal Company.

"Matachin is the next station, so called from the fact that during the time when the work was conducted on the canal by the French canal company in the year 1887 about 2,000 Chinese workmen who lived at this town died of yellow fever. This station is about $17\frac{2}{3}$ miles from Panama, and has a side-track capacity of 98 cars; also a railroad water tank. The number of inhabitants is about 800, principally Jamaica negroes and Chinese.

"Gorgona is the next station, 19 miles from Panama, and has a sidetrack capacity of 21 cars. The population is about 3,000.

"Mamei is the next station, $21\frac{2}{3}$ miles from Panama, and has a sidetrack capacity of 93 cars.

"The next station of importance is Tabernilla, 26 miles from Panama, having a sidetrack capacity of 41 cars. The number of inhabitants is about 200.

"The next station is Frijoles, about 29 miles from Panama. It has a railroad sidetrack capacity of 49 cars and a railroad water tank. Near the station are also located a number of machine storehouses of the French canal company.

"Bohio Soldado is the next station, $32\frac{1}{6}$ miles from Panama, and has a sidetrack capacity of 70 cars. Population about 400, negroes and Chinese.

"The next station is Lion Hill, 37 miles from Panama, with sidetrack capacity of about 24 cars. The number of inhabitants is about 200, all blacks.

"Gatun is the next station, $40\frac{2}{3}$ miles from Panama, with side-track capacity of 70 cars. This town has about 800 inhabitants, located on both sides of the Chagres River. Easy communication by means of small steamers can be had from this station to the coast. The river here is about 10 feet deep and 150 feet wide.

"Colon is the next town and the terminus of the Panama Railroad, located $47\frac{2}{3}$ miles from Panama. In the city of

Colon the railroad company owns a large two-story office building near the railroad station. The side tracks of the railroad in this city have capacity of about 620 cars, while the side tracks of the railroad company in the city of Panama will accommodate 400 cars. There are good railroad water-tanks at both Colon and Panama.

"Culebra is the highest point on the railroad line and is about 300 feet above the level of the sea.

"The configuration of the country and the topographical features are well shown on the large map referred to, 'Carte de L'Isthme.'

"About 2 miles south of Colon, along the railroad, is a small station of five or six frame houses, near the foot of a small hill about 150 feet in height, known as 'Monkey Hill.' Artillery placed here would command all approaches to Colon from the south. It would also command the city of Colon, and, were the artillery of sufficient power, would command both the harbors of Manzanillo and Limon Bay.

"The north entrance to the canal is located about one-half mile west of Monkey Hill, and can be plainly seen from the top of the hill. All along the railroad and canal line between Colon and Panama the country is overgrown with a dense underbrush, rendering communication along the trails very difficult. There is no wagon road or cart road across the Isthmus, only a narrow trail 2 feet wide, with low-hanging vines and underbrush over head, quite impracticable during the rainy season for travel. There is absolutely no land communication from either Colon or Panama along the neck of the Isthmus with the interior of Colombia. The only communication had with Bogota or the interior of Colombia from the State of Panama is by steamship from Buenaventura Harbor on the west coast of Colombia to Panama, while the only communication on the Atlantic side is by a steamship from either Cartagena or Sabanilla.

"There is at present communication from Porto Bello Harbor across the Isthmus with Panama, by means of the old Spanish mule trail. This trail was at one time in very good condition, having been paved with cobblestone by the Spanish, but it is now in very bad repair, and during the rainy season almost impassable for mules and horses."—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

“DESCRIPTION OF A TRIP BY THE PANAMA RAILROAD.— Leaving Colon, we crossed the embankment leading to the mainland, the Spanish Main of early writers. On our right there was an immense mangrove swamp, one mass of green; beyond the swamp was a little hill; then more lowland. The tropical jungle became thicker and thicker; in places it was so thick as to be absolutely impassable. Here and there were stretches of banana. These were interspersed with palms and other vegetation. Here and there a native hut could be seen on the hillsides. It was not long before we were at Gatun. To our right we caught a glimpse of the River Chagres, a peaceful stream in the dry season, but often, during the long wet season of the Isthmus, a huge, destructive volume of water. The railway there follows the left bank of the river as you approach the Pacific. Opposite the small station and just across on the opposite bank was the Indian hamlet of Gatun. In those days (1880) it was a mere collection of huts built of bamboos, thatched with palms or oleanders. We gradually approached the bridge of Barbacoas, 612 feet long. The river at this point in the dry season is a peaceful, shallow stream, perhaps 200 feet wide. During one of the floods of 1878 the valley of the Chagres was overflowed, and there were 12 to 18 feet of water over the railway. Beyond the bridge were trees, unfamiliar to me, and creepers in flower; orchids and palms also claimed attention. The great luxuriance and density of the vegetation, including palms, bamboos, and cottonwoods, became noticeable. The cottonwood especially, a huge tree with tremendous flanges at its base, is a characteristically tropic form of the native flora.

“Matachin is the midsection of the railway, and there the trains crossed. Not far from Matachin on the right is a once famous but now forgotten hill. It is named ‘Cerro Gigante,’ or the ‘Big Hill,’ and from its crest Vasco Nuñez de Balboa first saw the Pacific in the early morning of September 13, 1526.

“Culebra is the highest point of the railway, 238½ feet above the level of the Pacific. It is on the crest, or ‘divide,’ as it would be termed in the Rockies. The density of the vegetation may be gathered from the fact that rank grasses and undergrowth crowded down to the very rails. Men are constantly employed in cutting it away. It has been stated

that if the Panama Railroad remained unused for six months the whole line would be grown over with tropical jungle. Having passed the crest, we commenced descending. In the distance we saw Mount Ancon, a small volcanic peak. It is just back of the city of Panama. Then we came upon more swamps and more mangroves and black soil. Here and there were great arms of the sea, or 'sloughs,' as they are termed in California. At high water they are filled; at low water they resemble great muddy ditches. They connect with the Rio Grande some 2 miles back of the city of Panama. Passing a small Indian village on the outskirts of Panama, we drew up in the station of the city."—*Descriptive Geography from Original Sources, by F. D. and A. J. Herbertson, 1902.*

"This very important connecting link between the Pacific and the Atlantic oceans has become a part of the assets of the Panama Canal Company, but it is operated under American charter (New York), a board of directors being kept in New York City for that purpose. The termini of the road are Colon on the Atlantic side and Panama on the Pacific. The length of the line is 47 miles, and there are 34 stations, to wit:

Station.	Distance from Colon.	Station.	Distance from Colon.
	<i>Miles.</i>		<i>Miles.</i>
Ch. Columbus.....	0.30	Bas Matachin.....	29.11
Monkey Hill.....	1.86	Matachin.....	29.97
Mindi.....	4.56	Bas Obispo.....	31.05
Gatun.....	6.60	Haut Obispo.....	31.94
Tiger Hill.....	8.17	Las Cascadas.....	33.11
Lion Hill.....	10.57	Empire.....	34.88
Ahorca Lagarto.....	12.70	Culebra.....	36.71
Bunji.....	15.45	Rio Grande Superior.....	37.30
Buena Vista.....	16.77	Cucaracha.....	37.97
Frijoles.....	18.77	Paraiso.....	39.09
Tabernilla.....	21.55	Pedro Miguel.....	40.34
Barbacoas.....	22.98	Pedro Miguel Tank.....	40.78
San Pablo.....	23.48	Miraflores.....	41.69
Bailamonos.....	24.45	Rio Grande.....	42.98
Mamci.....	25.86	Corozal.....	44.17
Juan Grande.....	27.46	Panama.....	47
Gorgona.....	28.60		

"Panama was not intended to be the Pacific terminus of the Panama Railroad. The road was to be built to Naos Island, some 3 miles farther away. It is at or near this island that all the steamers anchor, and the Pacific Mail Steamship Company has quite an establishment on it. By the terms of the concession the railroad forfeits annually \$30,000 to the department of Panama until the railroad

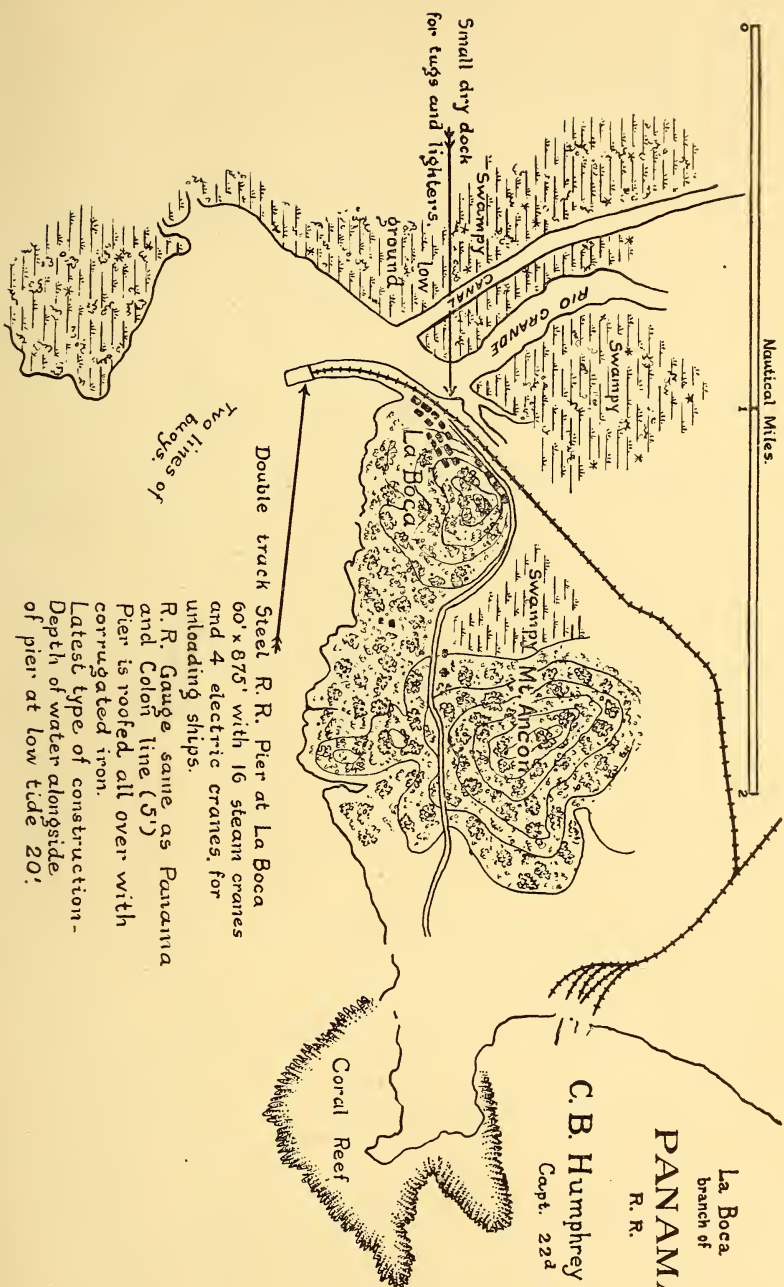
reaches Naos, or until vessels are enabled to discharge their cargoes on the main shore. Steps are now being taken to bring this about, the canal company intending to dredge the bay at the Pacific mouth of the canal (La Boca) so as to enable vessels of any size to enter, thus doing away with the expensive system of lighterage now in vogue here."—*Commercial Directory of the American Republics*, 1897.

Nautical Miles.



La Boca branch of **PANAMA** R. R.

C. B. Humphrey
Capt. 22^d Inf.



Panama Railroad Company. Time-table No. 12.

[Taking effect 6 a. m., Sunday, September 14, 1902.]

South bound (read down).				Distance from Colon.	Capacity of sidings.	Stations.	Distance from Panama.	North bound (read up).			
Second-class.		First-class.						First-class.		Second-class.	
No. 7, freight, daily except Sunday.	No. 5, freight, daily except Sunday.	No. 3, mixed, daily.	No. 1, passenger and express, daily.					No. 2, passenger and express, daily.	No. 4, mixed, daily.	No. 6, freight, daily except Sunday.	No. 8, freight, daily except Sunday.
Leave. P. M.	Leave. A. M.	Leave. P. M.	Leave. A. M.	Miles.	Cars.		Miles.	Arrive. A. M.	Arrive. P. M.	Arrive. A. M.	Arrive. P. M.
1.00	6.00	2.45	8.00	0	620	+ Colon	47.65	10.45	5.45	9.30	4.25
1.05	6.05	2.50	8.05 S	1.90	12	Mount Hope	45.75	10.35 S	5.35	9.20	4.15
1.15	6.15	2.57	8.10 F	4.52	15	Mindi	43.13	10.24 F	5.24	9.08	4.03
1.24	6.24	3.05 S	8.15 S	6.96	70	Gatun	40.69	10.18 S	5.18 S	9.02	3.57
1.38	6.38	3.17	8.24 F	10.62	24	Lion Hill	37.03	10.06 F	5.06	8.50	3.45
1.45	6.45	3.24 F	8.30 F	12.73	13	Ahorca Lagarto	34.92	9.59 F	4.59 F	8.45	3.40
1.55	6.55	3.33 S	8.38 S	15.50	70	Bohio	32.15	9.50 S	4.50 S	8.38	3.33
2.08	7.08	3.44	8.47 F	16.79	49	Buena Vista	30.86	9.40 F	4.39	8.08	3.05
2.20	7.21	3.53 S	8.55 S	18.73	41	Frijoles	28.92	9.30 S	4.30 S	7.58	2.55
				21.60	7	Tabernilla	26.05				
				22.82	4	Barbacoas	24.83				
2.29	7.30	4.02 S	9.03 S	23.54	2	San Pablo	24.11	9.23 S	4.23 S	7.51	2.48
		4.07	9.07 F	24.55		Balamonos	23.10	9.19 F	4.19 F		
2.40	7.43	4.15 S	9.15 S	26.00	93	Mamei	21.65	9.15	4.15	7.43	2.40
2.49	7.52	4.25 S	9.23 S	28.63	21	Gorgona	19.02	9.10 S	4.10 S	7.38	2.35
2.52	7.55	4.30	9.30 S	30.02	98	+ Matachin	17.63	8.50 S	3.47 S	7.17	2.17
2.57	8.00	4.35 S		31.10	9			8.47 S	3.42 S	7.10	2.10
3.01	8.04	4.39	9.34 S	33.13	36	Bas Obispo	16.55	8.43 S	3.37 S	7.05	2.05
3.09	8.12	4.46 S	9.41 S	33.13		Las Cascadas	14.52	8.38 S	3.31 S	6.57	1.57
3.21	8.29		9.45 S	34.92	46	Empire	12.73	8.34 S	3.26 S	6.50	1.50
3.26	8.34	4.55 S	9.50 S								
3.34	8.40	5.01 S	9.55 S	36.44	33	Culebra	11.21	8.29 S	3.19 S	6.43	1.43
			10.00	37.58		Rio Grande Superior	10.07	8.27			
			10.10 S	38.63		Paraiso	8.02	8.20 S	3.09 S	6.26	1.26
3.46	8.52	5.13 S	10.10 S								

Panama Railroad Company. Time-table No. 12—Continued.

South bound (read down).				Distance from Colon.	Capacity of sidings.	Stations.	Distance from Panama.	North bound (read up).			
Second-class.		First-class.						First-class.		Second-class.	
No. 7, freight, daily except Sunday.	No. 5, freight, daily except Sunday.	No. 3, mixed, daily.	No. 1, passenger and express, daily.					No. 2, passenger and express, daily.	No. 4, mixed, daily.	No. 6, freight, daily except Sunday.	No. 8, freight, daily except Sunday.
Leave, P. M.	Leave, A. M.	Leave, P. M.	Leave, A. M.	Miles.	Cars.		Miles.	Arrive, A. M.	Arrive, P. M.	Arrive, A. M.	Arrive, P. M.
3.53	8.58	5.17 S	10.15 S	40.79	24	Pedro Miguel	6.86	8.17 S	3.03	6.20	1.20
4.01	9.06	5.26	10.26 S	41.53	15	Pedro Miguel Tank †	6.32	8.15	3.00	6.17	1.17
4.06	9.11	5.30	10.30	42.15	0	Miraflores	5.50	8.12 S	2.56	6.12	1.12
4.10	9.15	5.35	10.35 F	43.41	0	Rio Grande	4.24	8.09	2.53	6.09	1.09
4.20	9.25	5.45	10.45	44.62	44	Corozal	3.03	8.06 F	2.45	6.00	1.00
P. M. Arrive.	A. M. Arrive.	P. M. Arrive.	A. M. Arrive.	47.65	400	+ Panama †	0	A. M. Leave.	P. M. Leave.	A. M. Leave.	P. M. Leave.
No. 7.	No. 5.	No. 3.	No. 1.			+ Telegraph stations. † Water tanks.		No. 2.	No. 4.	No. 6.	No. 8.
LA BOCA BRANCH.											
South bound.				Stations.	Capacity of sidings.	Distance from Colon.	Distance from Panama.	North bound.			
No. 15.	No. 13.	No. 11.	No. 9.					No. 10.	No. 12.	No. 14.	No. 16.
Leave, P. M.	Leave, P. M.	Leave, A. M.	Leave, A. M.					Arrive, A. M.	Arrive, A. M.	Arrive, P. M.	Arrive, P. M.
5.45	2.00	11.05	6.30					5.55	7.55	12.55	5.15
5.53	2.08	11.13	6.37					5.47	7.47	12.47	5.07
5.55	2.10	11.15	6.40					5.45	7.45	12.45	5.05
ive.	P. M. Arrive.	A. M. Arrive.	A. M. Arrive.					A. M. Leave.	A. M. Leave.	P. M. Leave.	P. M. Leave.

LA BOCA BRANCH.

INTERCONTINENTAL RAILWAY.—“Any location that may be adopted for a railway along the Pacific slope of the Isthmus of Panama would, from the point of leaving Costa Rica to its attainment of the Atrato Basin, cross nearly at right angles most of the streams emptying into the great ocean. In their order, from west to east, the principal ones would be the Golfito, which empties into the Gulf of Dulce; the Chiriqui Viejo, the David, and the Tabasara, which discharge into the Gulf of Alanje; the San Pablo and San Pedro, into the Gulf of Montijo; the Santa Maria, into the Gulf of Parita; the Chepo, which is navigable for small vessels and empties into the Gulf of Panama; the Turia, the principal stream of the Isthmus, which discharges into the Gulf of San Miguel.”—*Report of the Intercontinental Railway Commission, Volume I, part 1, 1891-1898.*

A PROJECTED RAILROAD.—“A contract has been signed by the minister of the treasury of Colombia and Don Pablo Pinzon for the construction of a railroad to connect the district of Bocas del Toro and Chiriqui, in the department of Panama. The work is to be completed within ten years and the concessionaire is to receive from the Government a subsidy of 5,000 pesos per kilometer.”—*Monthly Bulletin of the Bureau of American Republics, July, 1899.*

CABLES.—Communication with the outside world is maintained at Colon by cable via Jamaica, and at Panama via Nicaragua and Mexico northward and Buenaventura southward.

TELEGRAPH.—Two telegraph wires along the railroad from Colon to Panama belong to the railroad and canal company separately. The telegraph offices along the route are: Gatun (2), Bohio (2), Frijoles (1), Taverniila (2), Mamei (1), Matachin (2), Empire (2), Paraiso (2), Rio Grande (1), Corozal (2).

III. POPULATION.

(a) CENSUS, DISTRIBUTION, RACE, LANGUAGE, ETC.

“The inhabitants can hardly be classed as belonging exclusively to either of the three primal races. They are a curious mixture of red, white, and black—crude evidence of that lax morality which prevailed here in early Spanish colonial times. Just how these unfortunate people manage to live or why they never had the energy or ambition to better their condition nobody seems to know. Yet they are apparently happy in their life of poverty and wretchedness. They have few wants of body or mind. The indigenous plantain and banana afford a cheap and convenient substitute for bread, and fish from the streams and lagoons and a few yellow-legged chickens afford all the meat they want. Occasionally one sees an inferior specimen of the domestic pig or a forlorn-looking, half-famished donkey and sometimes a few domesticated ducks; but there are no cows or horses or other live-stock, and one rarely sees a vegetable garden. Toward the Pacific coast the country is more thickly populated, the houses are better, the people look cleaner, healthier, stronger, and more self-respecting.

“The present population is perhaps 400,000, including an independent tribe of Indians, who are said to number about 8,000.”—*The Colombian and Venezuelan Republics*. Scruggs, 1900.

“At present no group of Carib speech is known to inhabit any part of the Isthmus, although there are traditions that some of the warlike tribes in the central districts south of San Blas came originally from the Goajira Peninsula, which is still held by a powerful Carib nation. In recent years they have nearly all been absorbed in the general population—a mixture of Indians, whites, and mulattoes, in which the colored element is most pronounced. It is due to the large number of Jamaicans who were attracted to Panama by the high

rate of wages on the railway and canal works and many of whom afterwards settled in the country. The movement, unless arrested, must eventually assimilate the Isthmus to those parts of the Antilles where the African element predominates. In the eastern districts most of the aborigines, such as the Dariens or Papaparos, are extinct. But others, such as the Chocos, Queves, and Tules, still survive and constitute the Cuna family, whose affinities appear to be with the Chocos and Baudos of the Atrato and San Juan valleys in Colombia proper. (See table, Ch. III.)

“On the other hand, the Veraguas and Chiriquis, formerly dominant in the west, where they still form the bulk of the population, have abandoned the tribal system, with the associated usages and traditions, and are scarcely now to be distinguished from other Hispano-Americans of Spanish speech and culture. Nevertheless, they had, in pre-Columbian times, a culture of their own and thus formed a link in the chain of more or less civilized nations which extended, with interruptions, from the Pueblos of Arizona, through Mexico and Central America, into Colombia, Peru, and Bolivia.

“Like some of the neighboring Costa Ricans, the Veraguas of the auriferous district named from them were specially noted for their taste and technical skill in the goldsmith's art. Throughout the western section of the Isthmus, between the Chiriqui Inlet and Panama Bay, occur numerous prehistoric huacas (graves or barrows), which have yielded an abundance of gold and other artistic objects that had been deposited with the dead. Similar graves, some of large size, extend as far as the Gulf of Nicoya, but the objects found in them—obsidian, greenstone, and finely wrought jade tools and ornaments, knives, axes, armlets, rings, figures of men and gods, etc.—have been ascribed to Aztec influences, or even to the Aztecs themselves, who are now known to have ranged from Nicaragua into the adjacent parts of the present Costa Rica territory. Some of the barrows visited by Colonel Church in the district east of Guapiles are 100 feet long, 75 wide, and 15 high. ‘They appeared to be filled with broken statues of men, women, animals, and other objects sculptured from volcanic rock. We cut the weeds and exposed an immenese statute, which must have been 10 feet high,’ besides ‘a fine life-size specimen of the head of an alligator and one of a

puma.' But no mention is anywhere made of architectural remains or of any monuments at all comparable to those of the Mayas or Incas. In this respect the culture of these Costa Rican and Panama people shows more affinity with that of the Colombian Chibchas, who were also famous jewelers and goldsmiths."—*Stanford's Compendium of Geography, Central and South America*.

"All along the railway from Colon to Panama are little towns and settlements, but few good houses. The habitations are thatched-roof sheds with dirt floors, and their inmates a curious mixture of red, white, and black. The indigenous plantain and banana afford a cheap and convenient substitute for bread, and fish from the streams and lagoons and a few yellow-legged chickens afford all the meat they want. There are no cows or horses or other live stock, and one rarely sees a vegetable garden.

"It is necessary to know their language and disposition to get along with the people. Civil and kind treatment almost assures civil and even courteous treatment in return. Touching their sensibilities or wounding their vanity should be avoided. Serious disturbances sometimes result from a mere thoughtless jest."—*The Colombian and Venezuelan Republics*.—*Scruggs*. 1900.

DESCRIPTION OF PEOPLE MET WITH ON A JOURNEY BETWEEN DAVID AND PANAMA.—"Our departure from David having occurred on a Saturday, we had our Sunday rest at Chorchá, a small Indian hamlet 12 miles out, pitching camp near the dwelling of Doctor Pecuado, an immigrant Cuban physician, who comes hither annually from Panama to pass the summer. Mr. Obaldia accompanied us and introduced us to that hospitable colony. The Pecuados were the only white residents. They straightway adopted us into the tribe, and in effect we slept at camp and ate with the family. The beautiful mother would take no excuses. The doctor's farm covered 450 acres of fertile prairie and bottom, half of it timbered. Land-hungry readers may be interested to learn that this fine estate cost him just 20 cents, the legal fee for making out papers. It is only 2 miles direct from salt water, but the crooked river channel across the sea flat necessitates a canoe voyage of three or four hours. He cultivates the plantain and the cacao chiefly. Said that monkeys lessened his crops, as they destroyed more than they ate. Had a tiger hide 5½ feet long from muzzle to rump; tail nearly 2½ feet.

"We made the acquaintance there of another transient guest, Señor José Santa Maria Jovenes, one of two young bachelor brothers, to whom we are indebted for courtesy. They have a cattle range, wire fenced, on the eastern side of Rio Fonseca, probably including 2 square miles. Their grant is a tract 12 by 60 miles in area, its boundaries not yet marked on the ground nor definitely described in writing or graphical plan. It is 47 square miles larger than the average size of counties in Pennsylvania.

"Near Remedios we met a party of wild Indians from the interior—thick-set, strong-legged fellows. Their faces were painted, as if with a fine camel's-hair brush, in thin, black lines, a diamond figure inclosing the mouth, three or four horizontal stripes across the nose, forehead, and cheeks in tit-tat-to diagram, no two alike, of which holiday set-off they betrayed a little conscious vanity. They answered our salutations with pleasant grins and friendly gestures.

"Agricultural Indians, speaking Spanish, peopled the country along the line of our survey through Chiriqui and Veraguas. In the provincial capitals, David and Santiago, whites may have outnumbered them. The field population was almost exclusively Indian. They were happily circumstanced. Numerous villages strung on the trail—singles and clusters, variously spaced like beads of a rosary—would remind Pacific voyagers of the coral archipelagos, each village an atoll with oval or circular prairie for lagoon, a girdling reef of cabins, then the all-surrounding woodland sea. Like their island cousins, before the paleface blasted them, they are for the most part in their first childhood as communities, sucklings of nature, to whom she bears a milkier bosom than to the Eskimo and Fuegian.

"Their cabins stand apart, within talking distance usually; clumps of mangoes and cocoanut in front, narrow plantations behind, similar to those of the French Canadians along the St. Lawrence, cleared from wilderness and sloping to brook or river—water convenient being a prime necessity. Perennial vegetation and a warm, equable climate, tempered by ocean winds, countervail the disadvantage of a soil but moderately rich. Cattle, horses, pigs, goats, and fowls feed at large. Every family is well housed, well fed, without toilsome labor, and the grown members well and cleanly clad; the wives tidy, robust, cheerful helpmates; the naked young broods

frisking like colts on the greensward. All villages alike are scenes of peace, welfare, and contentment.

"Their social economy, their generous hospitality, their good-fellowship, and neighborly virtues have come down to them, it is believed, not only from before the 'Conquest,' but from the period antedating a previous invasion, probably of Phœnician adventurers or immigrant warriors from Atlantis. These traits, as well as their features, color, and the antiquities of their country, bespeak them a race identical with our North American Indians, modified in some respects by an infusion of Semitic blood."—*Report of Intercontinental Railway Commission; 1891-1893, Vol. II.*

"THE TALAMANCANS.—Within less than 100 miles of where is contemplated the greatest interoceanic ditch the world has seen there dwells an Indian nation that is to all intents and purposes identically the same to day as it was when Columbus first discovered the Western Hemisphere. These are the Talamancans, who inhabit a few square miles in the mountains almost midway between the two oceans, and but a comparatively short distance from the Panama Railroad, though it is much to be doubted if they have ever seen it or are aware of its existence.

"For upward of four centuries the mediæval civilization of Spain has surrounded them on all sides, but their language is still their own and seems to have lost little of its original character through contact with the execrable mixture of English, Spanish, and French spoken by the lower classes throughout the West Indies and along the Spanish Main. As they live in virtually an unknown region, at least three days' journey from the nearest settlement, their solitude is seldom broken. The visitor is received with the greatest hospitality and is welcome as long as he desires to remain. Their visits to the outer world are infrequent, rarely extending beyond the nearest port, and are undertaken only in quest of luxuries.

"Extra fowls and porkers are bartered on these occasions for tobacco, geegaws, and ammunition. The spear and blow-gun are used more than firearms for various reasons. The former are not only infinitely cheaper, but usually more effective in the hands of the Indian than the cheap muzzle-loading fowling piece of French or German origin with its paper-like barrel—the only arm he can afford to purchase besides the machete.

“Their language and customs in some respects resemble those of the score or more of widely differing peoples that are scattered over the territory lying between the Mexican border and the Isthmus.

“Their ancestors doubtless served Aztec masters for centuries before Cortez appeared on the scene to impose a worse slavery upon them, for they are not of the superior race of which so many reminders in the shape of gold and silver ornaments, stone idols, and curious specimens of pottery have been unearthed in quantities in several of the Central American States, and being the opposite of warlike they could easily be held in bondage.

“They are not idolaters in any sense of the word, nor do they profess religion or hold public worship of any nature, though their belief tends more to fear of an evil spirit than faith in a good one; in fact, the Talamancans present an instance of a nation without a doctor, a lawyer, or priest, the ‘sokee,’ corresponding to the medicine man of the North American tribes, usually combining the functions of all three. Polygamy is the most important feature of their domestic relations, few, if any, of the members of the different tribes being content with less than three to half a dozen wives, while his Talamancan majesty might well exclaim with Launcelot, ‘Alas! Fifteen wives is nothinge.’ His seraglio is usually better provided in point of numbers.

“The government of this Indian nation is entirely hereditary, and it is astonishing to learn of the many points of the doctrine of primogeniture as practiced by the reigning families of Europe with which they are familiar. Their laws are naturally few in number, both the legislative and judicial power, as is usually the case where no fixed principles of either have been acquired, being vested exclusively in the king. In common with others in his position the world over, he is a despot, and rules according to royal whim where this does not conflict with long-established custom. The marital relation is held sacred. The engagement of a girl begins within a few hours of her birth, the bridegroom to be making a contract with the parents at that time. It is usually consummated when she reaches the age of 10 or 12, a custom that is responsible for great disparity in the age and longevity of the sexes.

“The needs of the Talamancan are primitive to a degree

characteristic of the early ages of man, and as nature provides for him with a bounteous hand his is an existence of dreamy contentment undisturbed by thought of the morrow or fear of the hereafter. The rivers teem with many varieties of edible fish, and game abounds to a degree unknown outside the Tropics, while the soil is so fertile as to give rise to the saying that it will raise pickaninnies. A little corn and cassava are planted, and the soil and climate do the rest. When they mature, which in the case of corn is four times a year, they are prepared in the same manner as that practiced by their forefathers from time out of mind. Clothing, whether for man or woman, is of the scantiest description imaginable, except on gala occasions or a visit to the settlement, when the trousers and shirt of civilization are donned by the former, the children running about absolutely naked until several years old.

“The Talamancan’s hut, which is a masterpiece in the art of thatching, is a huge affair, and shelters his entire family and all his worldly possessions, including the domestic animals, that continually root around the interior during the day and retire with him at night. As he is a past master in the art of domesticating the wild deer, the peccary, the tapir, and even the tiger cat, numbers of these animals are present in every village, taking the place of the motley pack mongrels that usually greet the visitor at such humble settlements. His bed consists of the trunk of a certain species of palm, cut into strips and supported 3 or 4 feet from the ground on a frame, and a few earthen pots, with now and again an iron one, complete the furnishing of his house.

“While adept with the spear and deadly blowgun, in which various of the South American tribes employ poisoned darts, he is of the most peaceable nature, and his traditions contain no stirring tales of conquest, nor does his conversation boast of personal valor, for he knows not war. In short, the Talamancan is forever at peace with all the world, and only desires to pursue the even tenor of his way unmolested to the end of the chapter.”—*Scientific American*, November 21, 1903.

IV. RESOURCES.

(a) MINERAL RESOURCES.

"Gold is obtained from the rivers Marca and Balsas, in South Darien. There still lives the tradition of the famous mines of Cana or Espiritu Santo, in the neighborhood of the Tuira. At one time they were called 'Potosi,' on account of the abundance and fineness of the ore produced. There are likewise gold mines in the neighborhood of the rivers Coclé, Belen, and Indias, and their tributaries. Of these the most noteworthy is that of San Antonio, on the Coclé, which is reported as yielding \$40,000 a year. Other mines are found at Las Tablas, Las Minas, El Mineral de Veraguas, Sona, Lovaina, Gualaca, and San Lorenzo.

"Salt is found in abundance throughout the department, and at many points its production is more profitable than that of gold.

"Copper is found near San Felix and near the road from David to Bocas del Toro. It exists also, there is reason for thinking, in the old province of Azuero.

"Iron is to be found in and about the Cerro de San Cristobal and in the ancient province of Azuero, according to indications.

"Coal is found near Las Bocas de Toro and in Golfo Dulce.

"Mineral waters are found in the districts of Santiago and Calobre, near the headwaters of the Chonguinola, near the volcano at the foot of the Castillo Mount, near the Chiriqui River, in the Mendez Ranch, near the Yeguas Pass, in Pan de Azucar, and on the banks of the Gallequi River, near San Felix.

"Pearls are found not only in the Archipelago de las Perlas, but in many other spots on the sea bottom, which would seem to be almost covered with these precious stones. As many as one million shells a year are said to be secured by divers, and though all do not contain pearls they are available as mother-of-pearl.

"Chalk and lime also abound in various parts of the department."—*Colombia. Bureau of American Republics, 1892.*

"In the early days of the Panama Railroad, and later, during the canal construction period, numerous efforts were made to explore the coal regions of the Atlantic in near proximity to the ports of Colon and Panama. These researches led up to the discovery of bituminous shales and lignite near the port of Boca del Toro on the Caribbean Sea. Some hopes had been entertained that these deposits would give valuable coal, but an examination and analysis have convinced me that the veins are too small and the percentage of carbon too low to justify any expectation from this source. The largest vein I saw was about 3 feet thick, and the analysis gave—

Carbon	40.131
Water	12.962
Ash	30.216

"It will be seen at a glance that the coal has no commercial value, especially as some of the carbon was infusible and noncombustible graphite. Considerable work was done at these mines some years ago, but little signs of the excavations now remain, the opening being filled with débris washed in by the waters of the rainy season. These deposits do not cover an area of over 10 miles, and are not worthy of more than passing mention.

"On the Pacific, coal measures expose themselves near Punta Burica, in Colombia, and the peninsular projection that forms the northern inclosure of Golfo Dulce, in Costa Rica. The numerous small streams that flow into the gulfito from the cordillera, on the boundary of Colombia and Costa Rica, bring down fragments of lignite and coal, showing that they pass through large carboniferous deposits.

"Some work was attempted in these regions (judging from openings that are now nearly filled in with débris) many years ago, but evidently with meager results, owing to the fact that the exploring party did not enter sufficiently far into the interior to reach a healthy carboniferous formation. I consider it feasible to mine good coal in these regions at a distance of from 15 to 20 miles from the coast, as the crop-pings I examined at several points show veins from 3 to 6 feet thick of bituminous coal embedded in lignite and shale.

“The carboniferous measures of this locality cover an area of about 100 square miles, and are about equal to the coal beds of Chesterfield County, Va.

“This disposes, as far as I have investigated, of the coal beds of Panama, with the exception of those of Rio Chucunaque, about 12 miles northwest of Point Mosquito.”—*Monthly Bulletin of the Bureau of American Republics, 1893-94. Special Bulletin, November, 1893.*

(b) **TIMBER AND FUEL.**

“The department yields woods of excellent quality and colossal growth, principally in South Darien, though they abound also in the mountains along the coasts and in the islands of both seas. The following may be named: Cacique, corotú, and espavé, fit for shipbuilding, and not infested by any sort of insect whatever; caimito, hueso, cerezo, macano, madroño, naranjillo, bola, and laurel, excellent for polished work and building, as are also the mora and guayacan, which are, furthermore, incorruptible; níspero and espinoso, which make the best boarding known; mahogany (black, red, or veined), rosewood, rosilla, quira, cocobobo, and roble amarillo (yellow oak), which do not rot; roble comun (common oak), adapted for ship timbers; el manzanillo (manchineel), a building and cabinet wood; jicarrillo, and espino amarillo.

“Among furniture woods may be named the cedars known as cebolla, espina, real, and papaya, all of excellent quality and exempt from the attacks of the ‘comejen’ (timber worm); amarillo de Guayaquil, which is incorruptible; algarrobo del Perú, ijagua de montaña, alcornoque, chuchipate, and chachojo, all very useful for building; maderon, very durable and available for inlaid work; alfahillo, the same; tanjiro, similar to mahogany; jigna blanca, jigna negra, saponario, the leaves and bark of which are used as soap; majagua, used by the Indians for making ropes; palo de lana (wool-tree), similar to the ceiba or silk-cotton tree, and which grows to a height of more than 100 feet, and is used for canoes; hobo, a durable and colossal tree; bongo and balso, trees of considerable thickness, but very light, resembling cork, and used for making rafts; yaya, very durable; mangle, cavalero, pena, salado, and colorado, the last very durable and suitable for shipbuilding; culuba, much used for making mats, etc.; gachapalá and maría, good for masts; murciélagos, hobo de

puerco (é de cerco), barigon, haya, raton, carcún, sibo, and terciópelo, all useful to carpenters, as are also the guayabito de montaña, cerezo silvestre (wild cherry), pavo, mostrenco, and conaza.

"The following woods used for making dyestuff are found in the department: Uvilla, curtidora, divi-divi, dragon's blood, tuno, mulberry, Brazilian wood (brasilete), igua, aguacate colorado, guayacan, anil amarillo de yuca, carocolito (purple shell), muqueva, ojo de venado (black), tagua de montaña (indelible carmine), and nazareno (purple)."—*Colombia, Bureau of American Republics*.

(c) ANIMAL RESOURCES.

It is reported that mules may be obtained in numbers and in localities and in one week's notice, as follows:

Pedregal	100
Puerto Mutis	30
Mensable	50
Aguadulce	50
Chepo	10
Chorrera	10
Panama	50

—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

(d) PRODUCTS AND MANUFACTURES.

"The department produces cloves equal in fragrance to those of Ceylon; palosanto, from which is obtained the famous balsam maria; copaiba, caucho, almáciga (mastic), copachí, chutra, caraña, cabima, cateba, croton, palo de sangre, saumedio, jiguacanelo, bálsamo de drago, chiriquí, chinchire, tustele (yielding rubber, like the caucho), and palo de vaca.

"Honey and beeswax are produced in great abundance.

"The following fruits and vegetables are produced on the Isthmus, both wild and in cultivation:

"Aguacate, cacao, coco, pomaroda, mango, mamei del pais, naranjo dulce, naranjo agrio, limon, torovijo, marañon, guanábano, membrillo (quince), guayabo zapote, brevo, hicaco, anon, hagua, ñame, uvito guagabilla, calanva, níspero, cerezo, higo (figs), caimito, higo chumbo, granado, papayo, sabio,

granadillo, ciruela (plum), guate, curubo, piño, piñuelo, sapoya, cerenjena (eggplant), tomate (tomatoes), melon, sandía, calabaza dulce (squash), and eight sorts of aji (capsicum).

"Among the palms of Panama we may note the wine palm, the oil palm, the corozo, the royal, the chontadura, the umbrella palm, the cabeza de negro palm, the taparro, and the cocoa palm, which is remarkable not only for its fruit, but for being planted around settlements to protect houses from lightning, as it serves as a very efficient sort of lightning rod."—*Colombia, Bureau of American Republics*.

"While coffee is being grown everywhere in the department, yet, according to the practical study and experience of a Costa Rican, you find the land in the province of Coclé to be the best fitted for the cultivation of this most precious grain.

"Cocoa has a great future in the Isthmus, and there are already some valuable plantations under cultivation—rubber, ivory nuts, cabinetmakers' wood, wood for dyeing purposes, mother-of-pearl and tortoise shell, sarsaparilla, ipecacuhana, leathers and skins of different kinds.

"The tobacco produced is of excellent quality, but its production hardly suffices for home consumption.

"Sugar-cane products and the breeding of domestic animals constitute the principal riches of Chiriquí, Los Santos, Coclé, and Veraguas. They lend themselves to the cultivation of sugar cane, however, with great ardor, which promises such valuable returns through its products. The same can be said of the cereals belonging to their zone, which up to the present time is cultivated for interior consumption."—*Directory of Panama, 1898*.

"Ice, formerly imported from the United States, is now manufactured in Panama, where machinery with a maximum product of about 10 tons per day has lately been established. The ice is of poor quality, because of an imperfect and filthy water supply, and is sold at the high price of 5 cents silver (1½d.) per pound. Frequent interruptions in the service of this important commodity have occurred during the year, and many complaints are consequently heard in the community."—*Colombia, British Diplomatic and Consular Reports, Report for the year 1890 on Panama*.

(e) **REVENUES.**

TAXES, ETC.—“Previous to 1880 the Panama Railway had been paying to Colombia an annual revenue of 225,000 pesos gold, but in that year the income was anticipated up to March 27, 1908.”

EXPORTS AND IMPORTS.—“There is an important transit trade passing between the two ports of Panama and Colon. In 1900 the weight of goods transported westward by rail was 153,758 tons, of which 60,518 tons was from New York, 54,905 tons from Europe, and the remainder was in local traffic.

“The weight carried eastward was 203,619 tons, of which 118,670 tons was to New York, 77,219 tons to Europe, and the rest was in local traffic.”—*Statesman's Yearbook*, 1903.

“The export trade of the Department of Panama showed an advance for 1898 over 1897 of 19 per cent. The items showing the greatest percentage of increase are rubber, mahogany, ipecacuanha, cocobolo, medicinal balsams, bananas, and tortoise shells. The total value of the articles sent to the United States was \$777,792.69. Besides the articles named the following are included: Cacao, cocoanuts, coffee, raw hides, skins, ivory nuts, and mother-of-pearl shells. Exports to other countries amounted to \$131,733.66; to Great Britain, \$103,777.09; Germany, \$19,437.30, and France, \$8,519.27.

“From Bocas del Toro, the seat of the banana industry, 2,029,021 racimes (bunches) of plantains were sent to the United States in 1896. The value of this product at the port of shipment was \$405,804. The fruit is conveyed from Barranquilla in small United States steamers to the markets of Mobile and New Orleans, the round trip being made in twelve days. Fifteen firms in Barranquilla, which has a population of 10,000, deal in bananas. From Barranquilla the exports amounted to \$9,280,356.53, an increase over 1897 of \$670,303.57. The most important industry in this section is the manufacture of soap by two factories equipped with the latest appliances. A Spanish firm recently erected a modern candle factory and has a good demand for its goods. Other industries are several distilleries, an iron factory, two tanneries, with a monthly output of 3,000 hides, and a number of brick kilns and tile factories.”—*Monthly Bulletin of the Bureau of American Republics*, June, 1899.

“The exportation of products has commenced to be quite considerable in the Isthmus. Recent statistics demonstrate that the exportations equal one-half more or less of the importations of the department.

“The exports are very varied and rich, commencing with gold, but the present revenue statistics finds silver at the head, which is exported on a large scale from the northern shores, especially those of the rich and flourishing district of Bocas del Toro.”—*Directory of Panama, 1898.*

V. MISCELLANEOUS INFORMATION.

TABLE SETTING FORTH THE TERRITORIAL, POLITICAL, FISCAL, JUDICIAL ECCLESIASTICAL, ELECTORAL, NOTARY AND REGISTRY DIVISIONS, ETC., OF THE DEPARTMENT OF PANAMA, FORMED IN ACCORDANCE WITH THE LAWS, DECREES, AND REGULATIONS IN FORCE.

A. *Provinces of the department (political and fiscal).*

[Directory of Panama.]

Names of the provinces and municipal districts.	Distance to the city of Panama.	Distance to the city of Bogota. ^a	Mayoralties.
COLON (capital, Colon):	<i>Miriame- ters.^b</i>	<i>Miriame- ters.^b</i>	
1. Bocas del Toro	62.08	160	Chiriqui Grande, Bastimento, Bocas del Drago, Bocas del Toro.
2. Buenavista	5.03	142.3	Tabernilla, Ahorca Lagarto, Buena- vista, Caimito Mulato.
3. Colon	8.63	139	Monkey Hill, Majagual, Playa Flor.
4. Chagres	8.07	139.5	Lagarto, Salud y Rio Indio.
5. Donoso	(c)	(c)	
6. Gatun	7.25	139.2	Jamaiquita.
7. Portobelo	10.05	134	Nombre de Dios, Palenque.
COCLE (capital, Penonome):			
1. Aguadulce	18.25	165.5	Pocri.
2. Anton	15.25	162.5	
3. La Pintada	18.05	165.3	
4. Nata	17.08	165.1	
5. Ola	19.08	167.1	
6. Penonomet	17.03	164.6	Cocle, Paloverde, Rio Grande, Tuabre.
CHIRIQUI (capital, David):			
1. Alanje	52.25	199.6	
2. Bugaba	53.45	200	
3. David	50.55	197.8	Pedregal, Bajo Boquete, San Pablo.
4. Dolega	52.35	199.6	
5. Gualaca	50.35	198.1	
6. Los Remedios	40.08	188	
7. San Felix	42.04	189.7	
8. San Lorenzo	45.08	193.1	
9. Tole	37.03	184.6	
LOS SANTOS (capital, Pese):			
1. Chitre	25.56	172.8	
2. Guarare	28.14	175.4	
3. Las Minas	27.85	175.15	
4. Las Tablas	28.08	176.1	
5. Los Santos	25.65	172.8	
6. Macaracas	29.45	176.4	
7. Ocu	26.03	173.6	
8. Parita	23.85	171.1	
9. Pedasi	32.02	179.5	
10. Pese	25.25	172.5	
11. Pocri	30.01	177.4	Paritilla.
12. Santa Maria	21.55	168.8	
13. Tonosi	29.90	177	
PANAMA (capital, Panama):			
1. Arraijan	2.02	149.6	Cocoli, Farfan.
2. Balboa	8.05	(c)	San Miguel, Chiman, Saboga.
3. Capira	6.25	153.5	El Potrero, Cermenio.
4. Chame	8.75	156	
5. Chepo	7.00	154.3	Corozal, El Llano.
6. Chorrera	3.75	151.05	
7. Chepigana	20.75	168	Chepigana, La Palma, Garachiné, Jaqué, Jurado, Tucuti.
8. Emperador25	147.05	Culebra, Paraiso y Pedro Miguel, Cascadas y Casas Blancas.

^a Via Cartagena.

^b 1 miriometer equals 6,2138 English miles.

^c No data.

A. *Provinces of the department (political and fiscal)*—Continued.

Names of the provinces and municipal districts.	Distance to the city of Panama.	Distance to the city of Bogota.	Mayoralties.
PANAMA—Continued.	<i>Miriame- ters.</i>	<i>Miriame- ters.</i>	
9. Gorgona	3.75	142.5	Alto y Bajo Obispo, Matachin, Ma- mey y Bailamonos, San Pablo, Cruces.
10. Panama00	147.3	Pueblo Nuevo, Naos, La Boca, Pa- cora.
11. Pinogana	18.07	165.3	Cana. Pinogana, Yaviza, El Real de Santamaria.
12. San Carlos	10.05	157.8	
13. Taboga	1.75	149.05	Otoque.
VERAGUAS (capital, Santi- ago):			
1. Calobre	21.03	168.6	
2. Canazas	25.03	172.6	
3. La Mesa	27.08	175.1	
4. Las Palmas	31.08	179	
5. Montijo	26.65	173.9	Coibita.
6. Rio Jesus	27.95	175.2	
7. San Francisco	22.09	170.2	
8. Santa Fe	36.03	183.3	
9. Santiago	25.03	172.35	Atalaya.
10. Sona	30.08	178.1	

B.—*Judicial circuits and sections.*

BOCAS DEL TORO (capital, Bocas del Toro):	LOS SANTOS—Continued.
Bocas del Toro, con los corregi- mientos de Chiriqui Grande, Bastimentos, Bocas del Drago y Bocas del Toro.	5. Los Santos.
COLON (capital, Colon):	6. Macaracas.
1. Buenavista.	7. Ocu.
2. Colon.	8. Parita.
3. Chagres.	9. Pedasi.
4. Donoso.	10. Pesé.
5. Gatun.	11. Pocri.
6. Portobelo.	12. Santa Maria.
COCLE (capital, Penonome):	13. Tonosi.
1. Aguadulce.	PANAMA (capital, Panama):
2. Anton.	1. Arraijan.
3. La Pintada.	2. Balboa.
4. Nata.	3. Capira.
5. Ola.	4. Chame.
6. Penonome.	5. Chepo.
CHIRIQUI (capital, David):	6. Chorrera.
1. Alanje.	7. Chepigana.
2. Bugaba.	8. Emperador.
3. David.	9. Gorgona.
4. Dolega.	10. Panama.
5. Gualaca.	11. Pinogana.
6. Los Remedios.	12. San Carlos.
7. San Felix.	13. Taboga.
8. San Lorenzo.	VERAGUAS (capital, Santiago):
9. Tolé.	1. Calobre.
LOS SANTOS (capital, Pesé):	2. Cñaazas.
1. Chitré.	3. La Mesa.
2. Guararé.	4. Las Palmas.
3. Las Minas.	5. Montijo.
4. Las Tablas.	6. Rio Jesus.
	7. San Francisco.
	8. Santa Fe.
	9. Santiago.
	10. Sona.

C.—*Educational provinces.*

Municipal districts forming the provinces.	Rural schools in the municipal districts.
COLON (capital, Colon):	
1. Bocas del Toro	Chiriqui Grande y Bastimentos.
2. Buenavista.	
3. Colon	Playa de Flor.
4. Chagres	Lagarto.
5. Gatun.	
6. Portobelo	Palenque, Viento Frio y Nombre de Dios.
COCLE (capital, Penonome):	
1. Anton	El Valle.
2. Aguadulce	Pocri y El Cristo.
3. La Pintada.	
4. Nata.	
5. Ola.	
6. Penonome	Rio Grande y Toabre.
CHIRIQUI (capital, David):	
1. Alanje.	
2. Bugaba.	
3. David	Boqueron Pedregal, Las Lomis y San Pablo.
4. Dolega	Tinajas.
5. Gualaca.	
6. Los Remedios.	
7. San Felix.	
8. San Lorenzo.	
9. Tolé.	
LOS SANTOS (capital, Pesé):	
1. Chitre.	
2. Guararé.	
3. Las Minas.	
4. Las Tablas.	
5. Los Santos	La Palma.
6. Macaracas.	
7. Ocu.	
8. Parita.	
9. Pedasi.	
10. Pesé.	
11. Pocri	Paritilla.
12. Santa Maria.	
13. Tonosi.	
PANAMA (capital, Panama):	
1. Araiian.	
2. Balboa	Chiman.
3. Capira	Cermeno y El Potrero.
4. Chame	Bejuco.
5. Chepo.	
6. Chorrera.	
7. Chepigana	La Palma.
8. Emperador	Culebra, Paraiso.
9. Gorgona	Matachin y Bailamonos.
10. Panama	Pacora.
11. Pinogana	Santa Maria, Garachiné y Yaviza.
12. San Carlos.	
13. Taboga.	
VERAGUAS (capital, Santiago):	
1. Calobre.	
2. Cañazas.	
3. La Mesa.	
4. Las Palmas.	
5. Montijo.	
6. Rio Jesus.	
7. San Francisco.	
8. Santa Fe.	
9. Santiago	La Colorada.
10. Sona.	

D. Notary and registry circuits.

BOCAS DEL TORO (capital, Bocas del Toro):	LOS SANTOS—Continued.
1. Bocas del Toro.	7. Ocu.
COLON (capital, Colon):	8. Parita.
1. Buenavista.	9. Pedasi.
2. Colon.	10. Pesé.
3. Chagres.	11. Pocri.
4. Donoso.	12. Santa Maria.
5. Gatun.	13. Tonosi.
6. Portobelo.	PANAMA (capital, Panama):
COCLE (capital, Penonome):	1. Arraijan.
1. Aguadulce.	2. Balboa.
2. Anton.	3. Capira.
3. La Pintada.	4. Chame.
4. Nata.	5. Chepo.
5. Ola.	6. Chorrera.
6. Penonomé.	7. Chepigana.
CHIRIQUI (capital, David):	8. Emperador.
1. Alanje.	9. Gorgona.
2. Bugaba.	10. Panama.
3. David.	11. Pinogana.
4. Dolega.	12. San Carlos.
5. Gualaca.	13. Taboga.
6. Los Remedios.	VERAGUAS (capital, Santiago):
7. San Felix.	1. Calobre.
8. San Lorenzo.	2. Cañazas.
9. Tolé.	3. La Mesa.
LOS SANTOS (capital, Pesé):	4. Las Palmas.
1. Chitre.	5. Montijo.
2. Guararé.	6. Rio Jesus.
3. Las Minas.	7. San Francisco.
4. Las Tablas.	8. Santa Fe.
5. Los Santos.	9. Santiago.
6. Macaracas.	10. Sona.

Population electoral circuits or districts, 1870.

COLON (capital, Colon):

1. Bocas del Toro	5,250
2. Buenavista	1,458
3. Colon	8,246
4. Chagres	1,277
5. Donoso	2,903
6. Gatun	606
7. Portobelo	10,531

30,271

COCLE (capital, Penonome):

1. Aguadulce	3,074
2. Anton	2,792
3. La Pintada	5,711
4. Nata	5,888
5. Ola	3,756
6. Penonome	12,667

33,888

CHIRIQUI (capital, David):

1. Alanje	7,487
2. Bugaba	1,059
3. David	9,613
4. Dolega	3,407
5. Gualaca	2,413
6. Los Remedios	1,538
7. San Felix	2,230
8. San Lorenzo	2,309
9. Tolé	2,384

32,440

LOS SANTOS (capital, Pesé):

1. Chitre	2,378
2. Guararé	1,472
3. Las Minas	2,761
4. Las Tablas	5,047
5. Los Santos	4,023
6. Macaracas	3,199
7. Ocu	3,321

LOS SANTOS—Continued.

8. Parita	2,551
9. Pedasi	4,182
10. Pesé	3,318
11. Pocri	3,302
12. Santa Maria	2,264
13. Tonosi	1,500

39,318

PANAMA (capital, Panama):

1. Arraijan	1,319
2. Balboa	3,220
3. Capiira	1,501
4. Chame	1,961
5. Chepo	3,157
6. Chorrera	4,834
7. Chepigana	3,716
8. Emperador	1,420
9. Gorgona	2,564
10. Panama	16,406
11. Pinogana	3,715
12. San Carlos	2,034
13. Taboga	1,568

47,415

VERAGUAS (capital, Santiago):

1. Calobre	3,670
2. Cañazas	3,824
3. La Mesa	3,561
4. Las Palmas	2,691
5. Montijo	1,800
6. Rio Jesus	2,027
7. San Francisco	3,471
8. Santa Fe	3,508
9. Santiago	9,219
10. Sona	3,459

37,210

Total..... 220,542

Towns and localities connected by the telegraph.—Aguadulce, Anton, Arraijan, Capiira, Chame, Chitre, Chorrera, David, Guararé, Horconciotos, Las Lajas, La Mesa, La Pintada, Las Palmas, Los Santos, Las Tablas, Nata, Ocu, Panama, Parita, Penonomé, Pedregal, Pesé, Remedios, Santiago, San Carlos, San Felix, Santa Maria, San Lorenzo, Sona Tolé.

“An advance across the Isthmus from Colon toward Panama would be, of course, easiest by the railroad line, as the trails are all generally very difficult and overgrown with brush. There is a telegraph and telephone line which runs across the Isthmus along the railroad. The railroad is ballasted with rock nearly the whole distance from Colon to Panama. Light artillery could be taken along the railroad on trains or could be taken along the railroad track, when the necessary amount of boards and planks would have to be carried to lay over the bridges. Three equipped men on foot could march abreast along the railroad line.

“There is water communication from the mouth of the Chagres River to Gatun, which has already been spoken of.

The railroad is generally straight, with no more than the ordinary number of curves. Vegetation on both sides of the track grows most luxuriantly, there being a great many bamboo and banana trees.

"There are several hills which could be occupied to prevent advance along the line. The railroad is quite well equipped with plenty of rolling stock. There are about 65 bridges, principally steel, the most important and longest crossing the Chagres River at Gatun.

"About 150 small cart mules and horses could be obtained in the city of Panama; about 75 pack mules could be obtained in Chorrera, while not more than 50 or 60 animals could be obtained in the city of Colon.

"Guns mounted upon a point near the light-house in the city of Colon could protect both harbors against a hostile fleet. Fresh water is obtainable at Colon for vessels, but is of poor quality.

"About one-half mile west of the city of Panama is a large hill about 600 feet in height (Ancon). On the northeast side of this hill are located large hospital buildings of the French Canal Company. This hospital has 18 wards, each ward having 40 beds, and has very modern equipment. The drainage system, however, is not very well arranged, and at present the sanitary condition of the hospital is not good. Modern artillery could be placed upon this hill and command the city of Panama and both the harbors, also the anchorage near the island of Culebra. Other hospitals are the Hospital de Estrangeros, having room for 75 patients, and the Hospital of Santo Tomas, with 11 nurses, Sisters of Charity.

"The only points where troops could be landed near Colon on the Atlantic side of the Isthmus are Portobelo Harbor, Manzanillo or Limon Bay, at Boca del Toro, or in favorable weather at the mouth of the Chagres River. The only place where troops could be landed on the south side of the Isthmus is at the harbor of Panama or La Boca, or at the mouth of the Camito River near Chorrera."—*Report of Capt. C. B. Humphrey, Twenty-second Infantry, 1903.*

THE INTERIOR.—"Although in the search of a practicable canal route from the Atlantic Ocean to the Pacific, the Isthmus of Panama has been considerably explored transversely, it would appear that longitudinally it has not received the same attention. Thus, while we learn that between Chepo

on the south and the Gulf of San Blas on the north the Isthmus narrows to a minimum width, that the summit of the Cordillera reaches an altitude of but 1,500 feet, and incidentally that the Indians are numerous, warlike, and hostile; while from Cullen we learn that the Cordillera is reduced to a height of 350 feet between Caledonia Bay and the Savana River, and that the ridge here is but 2 miles wide at its base, falling away on both sides in level plains (statements proven to be erroneous by Selfridge); and while again we are informed that by following the course of the Tuira River we shall be led to a portage to the Atrato River of but 3 miles in length and 400 feet in height—while we are furnished with reports like these derived from journeys *across* the Isthmus, we look in vain for accounts of exploration *lengthwise* of this neck of land. Roads or trails there appear to be none. In the interior tropical growth, jungle, thicket, and swampy morass abound. The Cordilleras are irregular and difficult, few towns exist, and the Indians, in some localities at least, are unconquered, savage, and hostile. With such obstacles to overcome, it would seem on the whole that the interior of the Isthmus presents almost if not quite insuperable difficulties to extensive and continuous exploration or passage along its length.”—*Compiler*.

PUBLIC INSTRUCTION.

“While public instruction in the department leaves much to be desired, yet its progress is slow but sure. The great obstacle is the lack of competent teachers.

“The secretary of public instruction, in his report of the year 1898 to the governor of the department, states that elementary schools are springing up, one by one, throughout the entire department, but that it is of greater importance to produce good instructors than to multiply primary schools. With this end in view the normal school for teachers was founded in May, 1897, which is doing a promising work under the direction of two distinguished ladies, Doña Matilde and Doña Rosa Elena Rubiano C., who were brought from the capital of the Republic expressly for that purpose.

Educational statistics for 1896 and 1897.

	Pupils registered.	Pupils in attendance.
1897	6,592	4,006
1896	5,421	3,636
Increase of 1897	1,171	370
Further increase in 1897 by means of normal school pupils not included in the above estimate	103	103
Total increase of 1897	1,274	473

“For the most part the schools are abundantly supplied with the books and appliances required by modern pedagogy.

“The school fund has a revenue to be applied to educational purposes of more than \$160,000 per year.

Educational statistics of the Department of Panama for 1897-98.

Province.	Number of city schools (boys).	Number of city schools (girls).	Mixed schools.	Male teachers (graduates).	Male teachers (nongraduates).	Female teachers (graduates).	Female teachers (nongraduates).	Number of pupils registered (boys).	Number of pupils in attendance (boys).	Number of pupils registered (girls).	Number of pupils in attendance (girls).
Panama	15	14	10	5	18	-----	31	1,179	885	1,199	925
Colon	3	3	6	-----	3	-----	10	225	153	282	193
Coclé	6	6	4	4	3	-----	11	438	321	401	270
Los Santos	6	5	6	1	5	-----	11	389	268	339	255
Veraguas	3	3	6	1	2	-----	10	203	151	282	199
Chiriquí	7	3	4	-----	7	1	7	353	226	242	160
Total	40	34	36	11	38	1	80	2,787	2,004	2,745	2,002

Total number of pupils registered of both sexes..... ^a6,592

Total number of pupils in attendance..... 4,006

—(*Directory of Panama, 1898.*)

^aLeaving, apparently, 1,060 unaccounted for in above table.—*Compiler.*

VI. APPENDIX.

EXTRACTS FROM REPORTS OF EXPLORATIONS AND SURVEYS TO ASCERTAIN THE PRACTICABILITY OF A SHIP CANAL BETWEEN THE ATLANTIC AND PACIFIC OCEANS BY WAY OF THE ISTHMUS OF DARIEN, BY COMMANDER T. O. SELFRIDGE, U. S. NAVY, 1870-1873.

THE OROLOGY OF THE ISTHMUS OF DARIEN.

(Survey of 1870.)

The terms Darien and Panama are indiscriminately applied to the narrow neck of land between latitudes 8° and 10° north, connecting North and South America. Properly speaking, the Isthmus of Panama comprises all the territory watered by the Chagres and its tributaries across the divide to the Pacific.

The Isthmus of Darien extends from the San Blas Mountains, which separate the headwaters of the Mandinga and Marmoni from those of the Chagres, to the boundaries of the State of Choco, or to the mountain range from which the Tuyra or Darien River takes its rise, this range running in a southwesterly direction from the mouth of the Atrato toward the Pacific.

The Cordilleras, entering the State of Panama, diverge toward the Pacific, and on the line of the Panama Railroad are not distant more than 5 miles from that ocean. They lose their character as mountains, and the divide, ranging from 262 to 600 feet, is broken into a great number of isolated peaks and hills, through the gorges of which the line of railroad runs to the city of Panama. From the point where the railroad crosses the divide, the latter stretches to the northeast, increasing greatly in altitude, and bifurcates; one fork inclosing the headwaters of the Chagres, and, dividing it from the Mandina, meets the Atlantic in the vicinity of Cape Manzanillo. The other, stretching to the east within a few miles of the coast, takes the name of the Cordilleras Lloranes,

and forms the great backbone of the Darien Isthmus as far as the mouth of the Atrato. It here again suffers a depression, separating the Atrato from the Tuyra, and, turning to the southwest, forms with the Antioquian chain the Andes of South America.

Let the orology of Darien be carefully considered, and it will appear that though through its whole length it is narrower than any other of the transits spoken of, there are but few points which present any probability of a successful search for a low level.

The Cordilleras Lloranes skirt the Atlantic coast at distances varying from 5 to 8 miles, and varying in altitude from 1,000 to 3,000 feet. Between this range and the shore there are three other ridges or hills, decreasing in altitude successively, and cut up with valleys, through which the various water courses wind their way to the Atlantic. This feature does not permit plains of any size, circumscribes the valleys, and, breaking up the whole surface of the country, covered as it is with a dense primeval growth, renders all attempts at a regular survey of a most difficult nature.

From the close proximity of the Cordilleras to the Atlantic, we find no rivers of any size except the Mandinga; they are mostly brooks in the dry season and mountain torrents in the wet.

This dividing range through the length of Darien is very narrow at its crest, in some places not exceeding a few feet in width, with steep slopes and spurs jutting out from each side, over which leads the Indian trail. These spurs inclose ravines, which extend so far into the divide that the water courses which spring from them are often not more than a thousand feet apart on each side, and they would in themselves form an important feature in reducing the estimates of excavation, but for the fact that their mean level is too high to enable us to dispense with tunneling.

The western slope of the Cordilleras, being much wider, is drained by three large rivers. The Bayamo, rising in the Chiman range, an offshoot of the Cordilleras, flows north; the Chucunaqua, also rising in the southern slope of the Chiman Mountains, empties into the Tuyra not far from its mouth; the Tuyra, the largest river of the Isthmus, rising in the boundaries of the State of Choco in the south, drains the western slope and empties into the Gulf of San Miguel.

The Cordilleras skirting so closely the Atlantic coast, it follows that any deep depression in their outline could be seen from the sea, though its depth might be hid by the intervening hills that lie between them and the coast. No such depression is visible except in the valley of the Mandinga, and constant inquiries among different tribes of Indians still further strengthen this fact.

The Chiman range cuts the Isthmus transversely and separates the sources of two rivers, one flowing north and the other south; it is therefore evident the mean height of any transit line will be greater the nearer you approach the center of the Isthmus. In other words, from the configuration of the land as marked by the water courses, it must be at the extremities, and not in the center, that we can with any success hope to find a favorable route.

The northern extremity is but 36 miles across, and is the narrowest portion of the western continent. The southern extremity embraces the valley of the Tuyra; and, though wider than the other portion, it has the advantage, if reports are true, of having the lowest divide anywhere to be found. The question of harbors, entering so minutely into the canal problem, still further narrows our researches.

There are but two fine harbors on the Atlantic coast, the Gulf of San Blas and Caledonia Bay. Both of these are admirable and possess every requirement, and from their vicinity only could a canal well be constructed.

Though the Isthmus of Darien is an unexplored wilderness and but little known, yet, for the purpose of canalization, there are therefore but three portions that admit of any necessity of exploration to settle the question of its adaptability to the purpose in view.

CLIMATE.

The climate of Darien, like other portions of the Tropics, may be divided into two seasons—wet and dry. The former extends from May to January; but the rainfall varies greatly for different months. Commencing in May, this month and June are rainy, but in July and until the middle of August the weather is comparatively good, and labor at this period would be but little incmmoded.

In the middle of August commence the heavy rains, and they continue until January. Severe squalls, waterspouts,

vivid thunder and lightning, and such rain as may well be called a deluge mark this period. At this time no excavations would be possible not protected with sheds. The rivers overflow their banks and all low land near the coast is inundated.

The dry season, or the season of the breezes as it is sometimes called, commences in January and ends in May. At this time the trade winds blow fresh from the north, and a heavy sea breaks all along the coast, rendering it impossible to land or anchor when not protected by reefs or harbors. The climate at this period is delightful; little or no rain falls except in the mountains, which, intercepting the trade clouds, always precipitate more or less moisture upon the Atlantic slope; the air is moist and cool, the sky clear day and night, and the thermometer ranges between 79° and 86° .

After the expiration of the trades in the latter part of April, sea and land breezes prevail, and with them the thermometer rises to 88° and falls to 76° , showers are frequent, and heavy rain for a day or two.

Though the above is the general aspect of the seasons, the experience of this expedition has, however, been different. Rain has occurred more or less every month, particularly three or four days before the new moon, and especially in the interior, where work was interrupted whole days. Though it is a disputed point that the moon has any effect in disturbing the equilibrium of the earth's atmosphere, the changes of the weather with the changes of the moon were very marked upon the Isthmus. The closing days of the lunar month were sure to be marked with rain, and showers were always more frequent in the latter than in the early quarters of the moon.

With us the month of May was marked with unusually severe rains; the enormous amount of 7 inches fall in one night was recorded at Aspinwall; but during the first two weeks in June the weather was charming. Such an amount of rain in the dry season and such a heavy fall in May had rarely been known. The Isthmus of Darien has a most unenviable reputation for sickness. This is partly traditional, from the early experiences of the Spaniards, and partly from our experiences on the Isthmus of Panama, Nicaragua, and other portions of Central America. The formation of Aspinwall and of a portion along the line of the railroad is coral-

line. The mindi and other swamps in the bottom lands of the Chagres River hold in decomposition a vast amount of vegetable matter. Unfavorable as this should be, the record of the Panama Railroad develops a mortality of only 293 white men out of 6,000 that were constantly engaged on the work. The coolies fared the worse; the negroes and natives better.

That the Isthmus of Darien is vastly more healthy is not only the unanimous record of every previous explorer, but is abundantly verified by the experience of this expedition, which, numbering a force of 280 men, suffered but one death, and that from drowning, though exposed to a severe test from the constant exposure incident to the survey, which at all times required a large number in the field. The fever we met with differs from the Chagres fever, leaving none of the effects of the latter upon the system, and arose more from fatigue and privation than from any climatic causes. That a less favorable condition of health would be experienced in the wet season is undoubtedly correct; but our ships of war lie for months in the harbor of Aspinwall without injury, and I have no idea, with proper shelter and food, that the excavation of a canal upon the Isthmus of Darien would prove any more unhealthy than in many places in the United States where the virgin soil is first turned up.

INHABITANTS.

The whole of the Isthmus of Darien, except a small portion of the valley of the Tuyra, comprising the towns of Chipogana, Pinogana, Yavisa, and Santa Maria, and a few scattering inhabitants on the Bayamo near its mouth, is uninhabited except by the San Blas or Darien Indians. It is on account of their jealous exclusion of foreigners that so little is known of the country. In 1719 the Catholic missionaries had succeeded in establishing a number of towns on the Atlantic coast and upon the rivers flowing into the Gulf of San Miguel, but they were all destroyed by the Indians. In 1790 a treaty of peace was made with the Indians of Darien, in compliance with which the Spaniards abandoned all their forts in that district, in which no white man has since settled. They have the usual characteristics of the copper-colored race, but are much lower in stature than the North American

Indians, being rarely met with over 5 feet 6 inches in height. They are a muscular race, capable of great exertion for which their life in canoes or the broken nature of their mountain homes peculiarly fit them. They are very peaceable in their natures, and I could learn of no conflict between the villages, but yet independent and resolute against foreigners. They inhabit the whole Atlantic coast from San Blas to the the Tarena, mouth of the Atrato, and in the interior from the Sucubti to the upper parts of the Bayamo. There is no head or chief of the whole tribe, as commonly reported; but though the language and customs are similar, each village or tribe has its head man or chief, generally the oldest man of the tribe, to whom all pay great deference.

The Mountain Indians, or Bravos as styled by the Spaniards, are more numerous than generally supposed. On the Sucubti branch of the Chucunaqua we found three large villages that could not have contained less than 1,000 inhabitants. The most warlike, as well as the least known, and probably the most numerous, are the Chucunas and Navigandis, in the center of the Isthmus. The interior, back of San Blas, is uninhabited; neither are the Indian settlements with until you ascend the Bayamo some 40 miles.

The coast Indians, from contact with foreigners, are very docile and tractable, and by a conciliatory course I found no difficulty, after becoming known, in obtaining guides and all the information they possess of the interior; but they stand in awe of the mountain Indians and would never accompany me into their territory. They live principally upon fish, plantains, and bananas, with Indian corn and a kind of cassava. Some sugar cane is raised, the juice of which, extracted in a rude way between two poles, upon one of which an Indian jumps, they mix with cocoa for a beverage.

The women are very short, and their large features and straight coarse hair do not give them a prepossessing appearance. After reaching womanhood they cut their hair short and blacken the teeth. They wear large gold rings in their noses and ears, and necklaces of silver pieces, tiger, monkey, and alligator teeth. The women all tattoo across the bridge of the nose and paint their cheek bones red, but paint or tattoo is seldom used among the men.

I was not able to discover their ancient form of worship. Their belief in a Supreme Being is the result of contact

with the Spaniards a century ago rather than an ancient tribal belief. They believe in evil spirits, and their Leles, or medicine men, have numerous ugly images and ridiculous relics that are believed to possess the power to cure diseases. They are exceedingly averse to labor, except the little required in the cultivation of their fields, and no assistance from this source would be obtained for the work of a canal. They believe that God made the country just as it is, and that He would be angry with them and kill them if they assisted in any work constructed by white men. Work in the fields is left to the women, but the severe labor is mostly performed by men. Polygamy, though permitted, is rare, and the Darien Indians are particularly marked by their jealous exclusion of women from observation. During our stay at Caledonia Bay no women were ever met with, and upon our approach they were always removed from the villages, and this was the only mark of fear they evinced toward us. No traces of amalgamation were met with but some albinos. Their arms are principally the bow and arrow, in the use of which they are very skillful, and the single-barreled shotgun.

The Mountain Indians rarely visit the coast, except to trade their native products, ivory nuts, cocoa, and caoutchouc, for cotton cloths, beads, and a few simple domestic utensils. The Coast Indians carry on a large trade in cocoa-nuts, ivory nuts, and tortoise shell. Though the Republic of Colombia has a nominal authority, they have always maintained their independence. They number probably not less than seven thousand, but their strength lies in the rugged nature of their country. Their independence of character prevents the use of presents to any extent, and they will be of little service in procuring a desired policy. Individuals would refuse to receive gifts until they had obtained the permission of their headmen, and I could never prevail upon any of the chiefs to accept anything in my official capacity. An amusing example of this occurred on one occasion. I was paying my first visit to the chief of the Sassardis, and, ignorant of their prejudices, had brought for him a large present of cloth, needles, etc. He at first refused, but afterwards accepted them out of compliment to me, as he said, as I told him it was the custom in my country never to take back a present once given. After our council had broken

up, I noticed a palaver among them, and on my return to my gig found the present returned. I went back and told them I was very angry at their discourtesy, but they replied their customs would not permit them to receive presents from foreign governments. However, I put the present on the beach, and afterwards saw the cloth in the chief's house. This denial of what they would gladly purchase, showed an independence of character cropping out in an amusing way that was pleasant to find.

As a whole this tribe is cowardly, but treacherous, and, though they are to be feared only by small parties, become dangerous in a work like ours, from their knowledge of the country, to the scattered parties engaged in surveying or bringing up supplies.

GEOLOGICAL FORMATION.

The geological formation of the Isthmus presents but little diversity from the other portions of the great range of mountains of which it forms a part. There were no indications of recent volcanic action, and but few volcanic stones were found. The mountains themselves thrown up in the original upheaval are immense masses of syenite or trap.

The plains for from two to five miles from the coast are of coralline formation, covered with the alluvium washed from the mountains, a system of reclaiming from the sea which is a striking feature of the world's economy.

Passing from the coralline formation, we meet an outer cropping of sandstone at a high angle, which, although modified by the surrounding topography, taken in connection with the steep slope of the mountains on the Atlantic slope, appears to have been upheaved and at the same time folded over.

At an elevation of 100 feet on the Caledonia route, syenite is first met with, which, forming the substructure of the mountain area, extends for some 14 miles, where the sandstone again becomes visible, which continues the underlying formation until lost in the clay beds of the Chucunaqua. Indications of copper were found in great abundance on the Sassardi and Morti line, and veins of pure copper, though small, were traced for several feet. Iron and copper pyrites were met in great abundance, but no indications of gold

were discovered on any of the routes explored by the expedition.

Large numbers of agates were obtained on the Sassari line.

The San Blas route was singularly uninteresting in geological specimens. Decomposed syenite and sandstone were met with on the lower portion above an altitude of 20 feet, while trap composed the formation of the great mountain area of this route.

* * * * *

DESCRIPTION OF THE PORTION OF DARIEN TO BE EXPLORED.

(Survey of 1871.)

The Isthmus of Darien may be subdivided into three divisions—the northwestern, including the water-shed of the Bayamo River, on the Pacific, and the Atlantic coast bordering on the Bay of San Blas as far as the peak of Playon Chico; the central, from Playon Chico to a line drawn from Cape Tiburon to Cape Garachiné (the Cordilleras break off into two ranges at Playon Chico, one continuing along the coast, the other, crossing the isthmus transversely, ends in the high hills that skirt the north shore of the Gulf of San Miguel. This range forms the divide between the Bayam flowing to the north and the Chucunaqua to the south); the southern included between parallel $7^{\circ} 30'$ and $8^{\circ} 40'$ north latitude. From Cape Tiburon the coast range known as the Cordilleras Llorenes pursues an unbroken line, but a short distance from the coast, to the Puerto Escondido. At the latter point it recedes and bifurcates, the one fork running nearly south, gradually lessening in altitude till it disappears at the mouth of the Cacarica River; the other takes a more westerly direction till it strikes the Pacific coast, forming the true divide, known by the name of Sancti Espiritu Mountains. It is in the valley at the forks of this range that the Cacarica, a tributary of the Atrato, rises, emptying into the latter some 40 miles from its mouth.

The western slope of this range is drained by the Tuyra River, which empties into the Gulf of San Miguel. Two tributaries of the latter river—the Paya and Cué—have their sources very near those of the Cacarica and Peranchita.

The divide between them seems to lose its mountainous character, and is broken up into hills and spurs, over which an Indian trail, leading from one side of the divide to the other, is known to the "caoutchandos," or India-rubber hunters, as the pass of the Cacarica. This is the region, therefore, that I proposed thoroughly to explore—a task requiring a combined expedition from both oceans, which, running separate lines of level, should finally connect in the interior.

The principal explorers who purport to have visited this region are Hellert, Lacharme, Gorgoza, and De Puydt. The facts as stated by them are so positive as to the adaptability of this route that one could but feel it conclusive that here would be found a line fully equal to all the requirements of a suitable location.

Hellert contributed a paper upon his explorations to the Berlin Geographical Society, which seemingly gave it such authority that upon its assertions I based my plans for the survey of the Pacific slope. For a translation of this report by Professor Davidson I am indebted to the courtesy of the Coast Survey. Professor Davidson deduced from Hellert's notes the total height of the divide to be but 254 feet, and the Falls of Tapanaca, many miles above the Cué River, but 43 feet above sea-level. This was all *couleur de rose*, and here undoubtedly, if these figures had been borne out in facts, was the long-sought-for spot, or, as Hellert terms it, the "key to the Pacific." He says further that there are 8 to 10 feet, in the dry season, in the Tuyra River, as far as the Tapanaca, and that no rocks were to be seen over the whole of this distance, and the river bottom sandy, with small pebbles.

One may judge of my surprise when I learned from Mr. Nelson, the agent of the railroad at Panama, that Hellert was in his employ while in the country, and never penetrated the interior farther than Pinogana.

Mons. Lacharme, a civil engineer of South America, explored the valley of the Tuyra as far as the divide, in 1865, at the request of Señor Gorgoza, who supposed he had discovered in the Spanish archives information that would lead to the discovery of a pass for the proposed canal. Lacharme published a very interesting narrative of his travels, in Putnam's Magazine. He places the mouth of the Paya River at

144 feet above, and Paya Village, some twenty-five miles up that stream, at only 173 feet above sea-level. He states he followed the Indian trail from Paya across the divide, to a branch of the Cacarica, called the Tuculegua, which he places at an altitude of 169 feet. He purports to have gone some distance down the Cacarica, in all, two days' journey from Paya village, and to have returned in one day, measuring the distance with a chain. He places the summit level of his survey near the village of Paya at 178 feet, which is very remarkable for being the very datum given to him before he set out as the greatest elevation that would be practicable for the enterprise. It is also singular that he should find this summit but a short distance from Paya, when he must have known that the head waters of that river were many miles distant.

Señor Gorgosa also visited, I believe, the village of Paya, and the accounts he published were sufficiently flattering to lead to the formation of a company of capitalists in Paris for the purpose of acting upon his reports. They sent General Heine, an attaché of the American legation at Paris, to examine this route. Heine proceeded as far as the mouths of the Atrato, but, not being properly prepared, did not ascend the river, and returned to Aspinwall. The true facts obtained by the expedition will show how erroneous were the estimates of these explorers, and how much we who had believed in them were deceived.

INHABITANTS.

The population of the region explored during the past year may be divided into Colombianos and Indians. The former are composed of whites, mulattoes, samboes, and negroes. The latter compose at least five-sixths of the whole, and are an athletic race, but lazy and shiftless. They are to be found in the villages of Chipigana, Santa Maria del Real, Molineca, Pinogana, and Yavisa in Darien, and the small village of Turbo, or Pisisi, on the Gulf of Darien. They are principally engaged in the production of caoutchouc, in which an industrious man can easily earn \$100 a month; and as it permits a free and lazy existence, it is difficult to procure laboring men except at the most exorbitant rates.

At one time, no doubt, the whole of the valleys of the

Tuyra and Chucunaqua were inhabited by the Darien Indians, but they have disappeared entirely from the former, excepting the Paya tribe, on the river of that name. These Indians are less averse to strangers than any I had met with previously, owing, no doubt, to their long intercourse with the Spaniards, of whom, however, they are perfectly independent, and with whom there are no signs of amalgamation. They treated me with kindness when I visited them, but were sharp enough to avail themselves of our necessities in driving hard bargains for provisions. They do not number more than four hundred.

On the Atlantic slope, near the Tarena mouth of the Atrato, we have the villages of Arpeti, Cuti, and Tanela, all under the chief of the latter. The Indians of these villages are as isolated as those of the interior, and have all of the latter's dislike to white men. They have no dealings with Europeans; their towns are only approached through small streams in the marshes of the Atrato, where one is almost devoured by mosquitoes, and their only glimpse of the outer world is when they visit Pisisi to trade for the few wants they may require. These Indians were described by those of the expedition who visited them as the finest that had been met with in Darien. De Puydt asserts to have descended to the Tanela village, and even beyond; but, on the other hand, their chief, Suza-le-Lele, who was very unwilling that Lieutenant-Commander Schulze should explore their domain, told him that he was the first white man who had ever penetrated so far.

On the Chucunaqua there are now no villages of Indians below the Sucubti River, which was visited by the expedition in 1870.

The Indians of the Atrato Valley, called Chocó, are of a much milder disposition than the Darien. They were entirely subjugated by the Spaniards, and under these hard taskmasters were almost depopulated, and lost their tribal organization. Here and there families are to be found upon the rivers. They are quite inoffensive, and ready to offer their services as boatmen or guides. They are not averse to labor, and at Cupica Bay I found them tilling the ground by the side of the Spanish negro, whom in their present degraded condition they consider a superior being.

CLIMATE.

The climate of the lower portion of Darien is materially the same as that of the region explored last year. Of the two seasons, dry and wet, the former commences about the 1st of January and extends to the 20th of April. At this period the wind blows invariably from the north. After April there is more or less rain till the 21st of June. My own experience would lead me to believe that the heaviest rains during this season are in the first three weeks of May, and after that pleasant weather is frequent. July, though not a dry month, has but little rain. August denotes a reappearance of the wet season, though there is often much pleasant weather. September and October present the greatest rainfall; in November the amount is less, though this is the month of the most violent storms, accompanied with heavy rains. The rainfall in the interior is much greater than on the coast. While we were having only showers about the 1st of May, the journal of the surveyors records heavy rain. As to the effect of the seasons upon the construction of a canal, during nine months of the year there would be no more than partial interruption, and of these five may be considered as dry months. During the remaining three—September, October, and November—it is not probable that any work could be done except under cover. The wind during the wet season is usually from the south and west, with frequent calms. The temperature during the dry season is necessarily much higher on the Pacific slope, and the nights are often hot and close.

SOIL.

All through the Isthmus and valley of the Atrato the soil is of unsurpassed fertility. On the lower ground, subject to overflow, it has been enriched by the deposit of rivers annually brought down for ages, while at higher elevations the vegetable decomposition going on in the dense forest growth has given it a rich, loamy composition. All tropical products would flourish in profusion, but the ground is peculiarly adapted to the production of the sugar cane, which grows to an enormous size. Plantains are the staple food for both Indians and negroes.

The indolence and indifference of the inhabitants, the sparse population, and the enervating effect of the climate upon Europeans, seem to present almost impassable barriers to its improvement; and unless acted upon by such a powerful impetus as would be produced by the construction of a ship canal, it will probably remain forever in all its natural wildness.

FORESTS.

The whole of Darien is covered with a vast primeval growth from its swamps to the top of its highest peaks. Many of the trees I am unacquainted with, but among them are the following, more or less known: Caoutchouc, mahogany, ebony, oak, cedar, rosewood, espavé, quito, *lignum-vitæ*, ironwood, besides numerous varieties of the palm family.

The forest trees support whole families of parasites, and from almost every branch hang festoons of vines, which hide the trees from which they spring and present a scene of the richest luxuriance.

The puma, jaguar, tapir, and tiger cat inhabit the forests of Darien, but, hidden by day in the dense solitudes, are rarely met with. Many varieties of the snake family abound, whose bite is generally deadly. The wild hog, or peccary, is found in great numbers all over the Isthmus, and forms the chief article of meat for the natives. Monkeys are numerous; also a small species of deer, armadillos, rabbits, and squirrels. Parrots and parroquets of the most brilliant plumage are met with everywhere; also the toucan, carpintero, chucara, and many other varieties not familiar. Wild turkeys are plentiful in the valley of the Atrato, and on the hills a beautiful bird like a pheasant, called by the natives the currasaw, is sometimes seen.

RIVERS.

The two principal rivers of the portion of Darien explored the past year are the Atrato and Tuyra. The Atrato, probably the fourth largest river in volume in South America, rises in a spur of the Antioquian Range that connects the latter with the divide, or Cordilleras of Darien. Flowing on a course generally north for several hundred miles, it discharges itself through thirteen mouths, of which the principal

are the Tarena, Candelaria, Barbocoas, Coquito, Coco-Grande, Uraba, and Pichindi, and empties into the Gulf of Darien. The valley which it drains, between the Antioquian Mountains and Cordilleras, extends from latitude $5^{\circ} 26'$ north to $8^{\circ} 5'$ north, and varies from 100 to 150 miles in width. Its principal tributaries on the west bank are the Cacarica, Salaqui, Truando, Opogado, Napipi, and Bojaya; on the east, the Tumarador, Sucio, Murindo, and Muri. The Atrato was surveyed by Commander Lull for 160 miles, or as far up as the mouth of the Bojaya. Its banks are low, and for the whole of this distance during the wet season are overflowed to the depth of 3 or 4 feet, from which cause all the houses are built upon piles. Below Sucio there are no habitations upon the banks, as they are submerged ten months of the year. This river resembles the lower Mississippi in grandeur of proportions, with its long reaches, its width, varying from 1,500 to 2,500 feet, and its great depth, often exceeding 60 feet. Its current varies from 2 to 3 knots per hour, which would be much increased in the rainy season but for the overflow of the banks, which permits an escape of the surplus water by spreading for miles over the adjacent country. Trautwine, in his report upon this river, states that there are not more than 18 feet 90 miles from the mouth. It is probable that his soundings were made from a canoe, which, in passing upstream, would keep in slack and shallow water.

Our survey was carefully made in a rowboat floating down with the current, and nowhere in the channel were found less than 28 feet. Over the whole distance surveyed no rocks were met with, the bottom muddy, and from its great depth the river was unobstructed with snags. So well defined is its channel, and so free from obstructions, that a single passage up and return would be sufficient to make one acquainted with the navigation. The mouths of the Atrato are at present obstructed by bars, upon which there will never be found more than 6 feet of water. They differ in character, however, according to their protection from the sea. The Uraba mouth, the one that it is proposed to utilize, being farthest from the sea, and also protected by a long sand spit, is fixed in its nature, and the bar of hard sand. These bars, as they are increased by fresh deposits, are slowly extending out, and break off abruptly from 2 fathoms into 10. An examina-

tion of the Uraba mouth showed that as soon as the deposit on each side of the channel was sufficient to rise above the water and give growth to water plants, the water commenced to deepen; and where the banks were of sufficient consistency to give growth to mangrove and palm, and thus confine the flow of the current, a depth of 4 or 5 fathoms would be found. In the improvement of the bar, I would suggest that this action of nature be imitated in creating artificial banks by piling out to deep water, and a channel dredged out, which could be accomplished at a moderate outlay.

THE TUYRA.—This river differs entirely in its character from the Atrato. It rises in the Pirri Range, not far from the Pacific coast, flows first east, then gradually in a semi-circle to the north as far as the Paya, and, taking about a west-northwesterly course, empties into the Gulf of San Miguel. Above tide water, during the dry season, its bed for 50 miles is filled with rapids, upon which there is scarce water enough to float a canoe to the Falls of Tapanaca. Above the falls it dwindles into a small stream. It is about 300 feet wide over most of this distance, very crooked, and the marks on the trees indicate a rise of 16 feet during the wet season. Passing almost its entire course through a hilly country, through its numerous tributaries it pours out a vast flood of water during the season of rains. Of its branches, the principal, on the left bank, are the Tucuti, Pirri, Arusa, Cupe, Paca, Piedra, and Cana. On the right bank it receives the Chucunaqua from the north, a river of the same size and hardly a tributary; the Yape, Pucro, Paya, and Cué, the latter probably the same as known as the Punusa in the old Spanish maps.

EVAPORATION.

Experiments at Muertos Island, Gulf of Darien, continued through the greater part of the dry season, showed an evaporation of 1 inch in five days. As this test was made with a very small body of water (in a wooden tank made for the purpose) it is believed to be the maximum amount for this locality, and though a smaller quantity than generally allowed for this latitude, yet when the very moist condition of the atmosphere is considered it is not surprising that it is not capable of absorbing more.

HEALTH.

The sanitary condition of the late expedition has been fully equal to that of 1870, and the fact that no mortality has taken place from climatic causes is most gratifying, in the face of the reports of the unhealthiness of this part of the continent.

The percentage of sick on both expeditions has not been much greater than upon the ordinary service, though officers and men have been constantly exposed to the full malarial effect of the climate. The prevalent diseases were fevers (remittent and intermittent), disorders of the digestive organs, and skin diseases. Fevers did not assume a dangerous type, though very exhaustive in their effect. Eczema occasioned much annoyance, and was difficult to heal. Bites from the hordes of insects that infest the jungles and forests, though not dangerous, were very painful, and, in causing loss of sleep, often brought on fever.

Malaria, though necessarily active in such a wet climate as that of the Isthmus, does not, in the uncleared portions, appear as poisonous as in many other portions of the world which have a higher reputation for health. I attribute the fact to the hilly nature of the country and great waterfall, by which all vegetable decomposition is quickly carried off, and also that the dense tropical growth does not permit the action of the sun's rays.

To the very stringent sanitary regulations, such as requiring flannel to be worn next to the skin, or, when on the survey on shore, that every person should put on a dry flannel change at right; the liberal use of quinine as a prophylactic, in doses of $1\frac{1}{2}$ grains every morning to each person in the field; to the ample supply of wholesome food, at least 3 pounds to a man; to the absence of intoxicating drinks; and to the but moderate indulgence in fruits, may be attributed, under Providence, in a great degree, the health of the expedition, engaged as we were in a fatiguing and laborious task, exposed alternately to the fierce rays of a tropical sun and to constant wettings from rain or work in rivers.

The experience of this expedition and others, of the Panama Railroad Company, and of residents on the Isthmus, proves that the climate is not as unhealthy as generally sup-

posed, and that it is possible to reside here many years without serious injury.

In the employment of such a vast body of men as would be required in the construction of a ship canal, the preservation of health is a subject of the highest interest, not only on the score of humanity, but as vitally important to the success of the enterprise. It is confidently believed that by comfortably constructed quarters, with which should be connected apparatus for the quick drying of clothes, by rigid sanitary regulations, and by a regular supply of wholesome food, a state of health may be maintained that will compare favorably with newly opened districts in the United States.

Though the Indians, so far from increasing in numbers, appear to be rather the reverse, yet the great mortality seems to be in childhood, for many of the men attain a great age.

GEOLOGICAL FEATURES.

The study of the geology of those parts explored by the expedition, in their relation to other portions of the Isthmus, is very instructive; and attention is called to the interesting report of the geologist, Dr. G. A. Maache, upon this subject.

The results of our explorations of last year indicated that the base of the mountains forming the backbone of the Isthmus is principally syenite, which places them in the primary formation; while our observations, on the present expedition, from the valley of the Atrato and on the line of the Panama Railroad, would denote a substructure of trap and trachyte, and of a more recent creation.

From this we are led to infer that the central portion of the Isthmus was of an origin coeval with the continents of North and South America; that the foot of these mountains was washed by a united ocean, and not until a later period were the connecting links upheaved; for the geological and physical features of the southern portion of the Isthmus are very different from the central, the regularity of the Cordilleras losing itself in a broken country of very much less altitude, of which the hills are principally of a trappean origin.

The extraordinary depth of the Atrato for 200 miles from its mouth, and the very little fall in this distance (40 feet), though surrounded at not great distances by high hills and mountains, indicate plainly that the whole valley of the

Atrato was at one time an estuary of the ocean; that by a later upheaval the continents were connected and the oceans were separated, when commenced a gradual encroachment upon the sea from the decomposition of the hillsides (which is comparatively very rapid in this climate), being carried down by numerous streams, and, upon contact with another force from ocean waves and tides, deposited upon the bottom. We see this going on now in the changing of the delta of the Atrato, only very much slower, because from the sheltered position the action of the ocean is much less felt, and the influence of the many streams from the east side of the Gulf of Darien tend to carry the sediment of the Atrato farther seaward.

The geology of the Napipi River and Cupica Bay is of special interest, as having been the line selected that presented the most favorable features for the construction of a ship canal. Here the hills rise precipitously from the sea, and then slope away gradually till they terminate in a plain reaching to the Atrato, with a fall of about 5 feet to a mile. The formation of the hills surrounding Cupica Bay and the divide is trappean, and a closer examination of its mineralogical properties would constitute them principally as what is known in petrography as "hornblende andерite." Once over the divide, we have a stretch of some 3 miles of table land interspersed with clay hills of a moderate height. After descending into the plain, the outcroppings of rock become rarer as one proceeds, and often so decomposed as to be cut with a knife; and near the Atrato a stratum of decayed leaves is frequently met with below the surface, overlying red and blue clay. The rock at Cupica Bay, at the falls of the Limon River, and upon the Napipi, indicates great density and hardness; but the question of being self-sustaining can only be satisfactorily ascertained by boring.

No minerals were found during these explorations between the Atrato and the Pacific Ocean, though the formation is favorable to gold, and considerable quantities of the precious metal are obtained in the rivers that rise in the Antioquian range, which is of a similar formation.

Gold ornaments of ancient manufacture have been found in the bed of the Napipi River, and I have been told by the Indians that there is gold in the mountains, though they always refused to give any information in regard to it.

A very important discovery of coal was made in the region bordering upon the east side of the Gulf of Darien, an analysis and report of which, by Professor Barker, of Yale College, is appended to this report.

The survey of the Tuyra developed the general geological features of the Napipi. Interesting specimens of fossilized shells, embedded in rock and detached boulders, were found at various points on the Tuyra, and even on the top of hills—an additional proof that this formation comes within the later Tertiary formation.

Fossilized coral is found in the bed of the Chagres, 30 miles from the sea, and at a considerable altitude, while at the same place will be gathered pebbles of quartz, jasper, agate—all belonging to a different period than fossils.

* * * * *

DISCUSSION OF PROPOSED CANAL ROUTE VIA THE NAPIPI AND DOGUADO VALLEYS.

(Report of 1873.)

Much has already been said of the nature of the country, and difficulties to be encountered, in the valley of the Napipi in my previous report.

But as the value of this route depends so entirely upon the capacity of ship navigation of the river Atrato up to the point we leave it to cross to the Pacific Ocean by an artificial cut, I will again allude to it before proceeding to discuss the general features of the new proposed line.

Our knowledge of the Atrato is based upon a complete line of soundings, run by Commander Lull, for the whole distance, from the mouth of the Napipi to the mouth of the Atrato, who made the survey in his gig, taking soundings every five minutes. So important is the fact of the great depth of the Atrato that I append his letter to me on his return, as also one from the officer who accompanied him, Lieutenant Merrill:

UNITED STATES SHIP GUARD, FOURTH RATE,
Gulf of Darien, United States of Colombia, May 1, 1871.

SIR: I would respectfully inform you that, in obedience to your order, I have examined the river Atrato, from the mouth of the Napipi down to the mouth of the Cacarica, sounding as rapidly as possible, while pulling gently with the current, in the gig of this ship, making a running traverse at the same.

The least water found in the channel of the river was 28 feet although the surface was at least 6 feet below high water; we frequently found over 12 fathoms. There are very few obstructions, in the shape of snags, etc. All that we saw could be cleared away in a single day's work by a steamer.

The channel follows the curves of the shore so exactly that any pilot, after once going up or down the river, could never after make a mistake with regard to it. It is the clearest river I have ever seen.

The river bottom is all soft mud; we did not discover a single rock or stone the whole distance.

I beg to say that I use superlative language advisedly in speaking of this river, as its advantages for navigating purposes struck me as being so remarkable that I examined it with great care.

I am, very respectfully, your obedient servant,

EDWARD P. LULL,
Commander.

Commander THOS. O. SELFRIDGE,
Commanding Darien Exploring Expedition.

MARSHALL, Mich., August 5, 1873.

SIR: I accompanied Commander Edward P. Lull, U. S. Navy, on the survey of the Atrato River, and am confident that, after crossing the bar at the mouth, there will be no difficulty in carrying 26 feet of water to the mouth of the Napipi.

Very respectfully, your obedient servant,

JOHN P. MERRILL,
Lieutenant, U. S. Navy.

Commander THOS. O. SELFRIDGE,
U. S. Navy, commanding Darien Expedition.

No one who has visited this river and floated upon its surface as I have can but be struck with the grandeur of this mighty flow of water and can but feel that it has been designed by the Almighty to bear a more important part in the great economy of the world's progress than the carrying of the little crafts which are now its sole navigators.

That the Atrato is entirely and wholly capable of ship navigation to the Napipi is a fact that no longer admits of any doubt.

BAR OR OBSTRUCTION AT THE MOUTH OF THE ATRATO.

The Atrato spreads itself out into a delta at least 20 miles in length, and empties by 13 mouths into the sea.

The great difficulty that has been met in the permanent improvement of the mouths of all the rivers that empty into the Gulf of Mexico is the shifting character of the sands, caused by the action of the sea swell, and which requires the

constant use of the dredge, as at the mouth of the Mississippi, where the storm of a single night may open a channel entirely different from the one in use. While nearly all the mouths of the Atrato are exposed to this same influence that one known as the Uraba is an exception, as it empties into an almost land-locked harbor, the surface of which is hardly ruffled. This fact gives the character of its bar a permanence which none of the others possess in the same degree. Specimens of boring at a depth of 18 feet below the surface indicate that it is composed entirely of black and white sand whose geological properties are the same as the hills from which the tributaries of the Atrato flow. I was also struck by the fact that as soon as we crossed the bar to a point where the overflow was restrained by the growth of plants, then did the depth commence to increase, and as soon as the flow was confined by banks compact enough to sustain vegetation, the water at once deepened to five fathoms. This action of nature to my mind was conclusive proof that if the current was confined by artificial banks and the inclosed distance dredged to the required depth there would be a permanent channel requiring no further outlay to keep open.

From the ten-fathom line to a depth of five fathoms in the Uraba Branch it is about 2,500 feet. There would be required for a double row of piling the whole of this distance 10,000 trees 30 feet long and 1 foot or more in diameter. Trees of the variety known as the cedron, guallaca, or truntago, chacajo, and insivé can all be cut on or near the Atrato and its tributaries. These varieties are all hard and very durable, of a specific gravity less than water, and could be therefore floated to the desired spot and driven at a cost not exceeding \$5 per pile.

For a channel 300 feet wide and a depth of 26 feet of water, there would require to be removed 640,000 cubic yards of material. The expense, therefore, of the required improvement at the mouth of the Atrato would be:

10,000 piles, \$5 each	\$50,000
640,100 cubic yards material, 50 cents per cubic yard	320,000
	<hr/>
	370,000
25 per cent increase for contingencies	92,500
	<hr/>
Total	462,500
* * * * * *	*

POISON OF THE INDIAN ARROWS.

(Survey of 1870.)

We inquired of all the Indians, both men and boys, at Caledonia Bay and at San Blas for the "curari" or "urari" poison, so often mentioned, but none of them appeared to have ever heard the name. They admitted that they used poison on their arrows, and after numerous attempts they brought us what they represented to be the bona fide poison. It was a watery liquid with a white precipitate at the bottom, which became milky by shaking. They, by signs, gave us to understand that when it was intended to be particularly virulent it was necessary to expose it for three days in the sun, then mixed with a paste before applying it to the arrows. It turned out to be nothing but the juice of the manzanillo del playa. So, if this is their chief poison, and is the same as the "curari," it is not so much to be dreaded. Its effect appears to be different on different constitutions; on some, the juice will raise blisters, and the smoke of the burning wood will attack the eyes, while others experience no harm. The natives wash the injured parts in salt water, which is readily obtained, as the tree, fortunately, only flourishes near the sea coast. The young leaves and fruit steeped in milk are also said to be a perfect antidote. That which we have is extremely volatile, giving off a strong smell of sulphureted hydrogen and other smells which we could not detect. From its volatile nature alone we would infer that it was only to be dreaded while fresh, although the Indians maintain that exposure to the sun for three days causes it to regain all its strength. We tried some of it on our hands when first obtained, and it had no effect beyond the stinging produced by acid; we also have made several experiments on rats and cats since our return. The animals appeared to grow sick after ten minutes, inclining to cough or vomit, but in the course of an hour all unpleasant effects appeared to have passed away and they were as well as ever.

*

*

*

*

*

*

*

**MEDICAL REPORT OF THE DARIEN EXPEDITION, BY
LINNÆUS FUSSELL, ACTING PASSED ASSISTANT
SURGEON.**

(Survey of 1870.)

PHILADELPHIA, *August 25, 1871.*

SIR: In this report the facts recorded will be for the most part such as fell under my own observation. I shall, however, bring to bear on the subject information received from other sources, from the surgeons of the *Resaca* and *Guard*, and of the Panama Railroad Company, from books, periodicals, etc.

My services upon the Darien expedition lasted from December 3, 1870, to June 27, 1871. During that time I had medical charge of a surveying party for one hundred days, from February 22 to June 3, 1871, this service being a continued one in the wildest portion of the Isthmus of Darien.

The following is a summary of the amount of sickness, etc., during that time:

Number of men in party	24
Admission to sick list	41
Number of sick days	123
Average time sick, days	3
Daily average	$1\frac{23}{100}$
Daily percentage	5

These numbers may appear large; they are really the reverse, for this statement includes every case, medical or surgical, excused from duty from any cause however slight. No deaths occurred; no cases became chronic; no severe form of disease existed at any time during the progress of the survey. These observations apply not only to the party which I accompanied in the woods, but to the whole expedition, and for the whole time.

Several other surveying parties were on other parts of the isthmus, and the greater part of the officers and crews of the *Resaca* and *Guard* had extra work to do on hydrographic and other duty connected with the survey. All were exposed to the direct rays of the burning sun, to the poison of malaria, or both. With the whole command the same sanitary precautions were taken (which will be referred to hereafter), and with about equally good results.

Malarial fevers (intermittent and remittent) formed the greater part of the cases, twenty-one of the admissions out of

forty-one being cases of fever. Most of the other affections met with showed a distinct malarial impression, and all were benefited by the treatment proper to cases of fever.

Many causes cooperated to produce cases of sickness, the first and most important one being the poison of malaria, to which we were constantly exposed. Many different opinions are held as to the nature of this peculiar poison, to none of which I need allude. All agree that for its production, vegetable decomposition, favored by heat and moisture, is necessary; that this decomposition is most active when there is no more moisture than is necessary for that purpose. Uncommonly rainy seasons, followed by unusually dry ones, are very favorable to its development, as is every change by which a perpetual alteration of the water level is occasioned.

These conditions were present during the whole time of our trip, most markedly so at the commencement and toward the end of our survey. At the commencement the rainy season had ended, but the water which covers the lower portions of the country during this period had not yet had time to descend to its lowest point, and while we were ascending the river Cué the water was gradually falling, exposing masses of vegetable matter to decay, and constantly adding to the amount of malaria everywhere present. During the last month our survey took us over a very rough country, which, though generally of the kind which a late author speaks of as "very active in the evolution of malaria," ("such as are traversed by percolating streams or canals in wooded districts, termed jungles,") was composed of a succession of hills and valleys extending from the mouth of the river Paya (emptying into the Tuyra) to the town of Pinogana, a village some 30 miles farther down. The weather was also such as to favor the production of malaria—rain for one or two days, followed by hot, dry weather for a corresponding period. Other causes which had their influence in predisposing to disease may be merely alluded to; the fact of being compelled on many occasions to wear wet clothing, not only during the day, but at night, for, although ordinarily great care was taken to have the men put on dry clothes on finishing their work, it would often be impossible to keep dry owing to very heavy rains and imperfect shelter inseparable from such work in a perfect wilderness. The effects from bites from hordes of various kinds of insects, etc., may be alluded to, not sim-

ply from their local effects which were sometimes severe, but from the loss of sleep occasioned by this persistent annoyance. In this connection the bites of vampire bats should be referred to, as the stories told of them are by many deemed rather apocryphal. We were troubled with them more or less during the whole time we were out, but ordinarily they did not prove a serious annoyance; toward the latter part of our trip, however, some one was bitten almost every night; one night, the 13th of May, nine men were bitten. The men were rarely awakened by the bites, which, however, bled freely, sufficient blood being usually lost to saturate the clothing, and to show its effects very perceptibly in the loss of color and general feeling of weakness experienced.

I have now to consider the reasons which, notwithstanding the various predisposing causes to disease, led to the general continuance in health of the various members of the expedition. I would mention first, the fresh and most excellent water which we always found without difficulty; second, having regular hours for meals, and the good food furnished, it being of better quality and of larger quantity than that furnished to any army or navy in the world, amounting to 53 ounces ($3\frac{5}{16}$ pounds) of solid food per diem for each man; third, the total absence of all causes of excitement; fourth, the absence of all kinds of intoxicating liquors; the care taken to have each one in the party wear flannel next the skin. The good influences to be expected, *à priori*, from these causes are so evident that it will be needless to dwell upon them. As to the prophylactic use of quinine, some words will be necessary. With us the sulphate of quinia was used regularly from the time of starting out and continued during the whole period, with the exception of some three or four days. Before that time we had had but three cases of fever, all light attacks. At the end of the fourth day of the time in which the use of quinine was omitted, three men were attacked with the fever and on the following day three more. These six cases were in every respect the most serious ones I had to treat during the whole trip, though even they readily yielded in a few days to the free use of quinine. When these men were taken sick we were not exposed to a greater amount of malaria than before. The good effects of the daily use of quinine were so marked as to be readily perceived by even the sailors and macheteros of the party, with

whom at first great difficulty was experienced in getting them to take the medicine. Afterwards, however, they never neglected to come for it when served out in the morning, and used frequently to ask at other times for extra doses. It was given usually immediately before breakfast, about half the time being administered in solution in whisky, four grains to the ounce for each dose. Occasionally, after extra exposure or an unusually hard day's work, a dose would be given in the evening. During a portion of the time it was given suspended in clear, cold coffee, a method which masks most effectually the peculiar bitterness of the remedy; but I prefer, however, for small doses, the solution in whisky, the small amount of the latter in each dose being in itself very beneficial.

Quinine, as a prophylatic against fever, has long been used, and its good effects noted by all who have had experience in its use. I shall introduce here two quotations from writers upon the isthmus: "In 1855 the use of quinine enabled the Panama Line of steamers to continue their service during the sickly season, and has ever since been found to reduce the number of sick in the service to a mere fraction of its former amount, while it preserved from disease in a remarkable manner the officers and dependents of the railroad company on the isthmus." Dr. I. K. Merrill, surgeon of a mining and exploring party on the isthmus, states that "for more than two years the party enjoyed an almost complete immunity from miasmatic disease under the systematic use of quinine.

The proper mode of giving quinine in cases of fever is a question upon which there has been much discussion, the principal difference of opinion being whether it should be given in one or at most two large doses or in small doses frequently repeated. My experience, which is in conformity with that of the surgeons of the Panama Railroad Company and that of a majority of the profession, is that one large dose—15 to 25 grains—should be given as early as possible, either as soon as the paroxysm has subsided or, if a recurrence of the attack is anticipated, in a short time, even at the commencement of the sweating stage, and with most excellent results.

It may be noted as a fact of importance that the antifebrile influence of quinine does not coincide with its physiological

effects, which are manifested almost immediately and subside in from six to eight hours. It is certain that the anti-febrile effects are manifested at a later period.

A word as to the manner of administration of quinine in large doses. Pills are readily taken by many, but they soon become hard and insoluble. The solution with sulphuric acid is undoubtedly the form in which it is most readily introduced into the system, but the taste is to many so unpleasant as to prove a matter of some importance in causing nausea and vomiting, which are easily produced in these fevers. I usually give it suspended in clear cold coffee, a mixture which a noted author says "produces a precipitate of the insoluble tannate of quinia, which is probably decomposed but slowly in the system." In every case, however, I found the physiological effects to be produced in about the same time as when given in the solution with aromatic sulphuric acid, and its curative effects were certainly as well marked as could be desired. When there is hepatic congestion the administration of calomel is usually called for in connection with the use of quinine. Opium is in many cases a useful adjunct. One point more as to treatment, and that is to put in my word against the necessity of any "preparation of the system" for the use of quinine by the use of purgatives, emetics, or both, as recommended by many. It seems to me scarcely ever necessary and often absolutely hurtful, as valuable time is often thereby lost, the natural tendency of the disease itself being sufficiently exhausting without adding to it by such unnecessary drains upon the system.

Whether the system can become even in a measure acclimated to the poison malaria is a question which seems to me should be decided in the negative, but upon this point "doctors disagree." Professor Aitken says, "It is now an established fact that no one can be acclimated so as to withstand the influence of malaria." Dr. Stephen Rogers says, "Gradual acclimation diminishes the danger of being attacked by the more violent forms of miasmatic disease."

Upon the diseases other than malarial met with little need be said. We were troubled with various forms of skin affections, which I here only allude to to note the good effects of carbolic acid, which was used in solution, one part of the acid to forty of water, and applied in almost every case. Its use

was mostly followed by immediate relief of itching, and a cure was generally accomplished in a few days.

Is the climate of the Isthmus a very unhealthy one or not? This is a question about which there is a wonderful diversity of opinion. There seems to be a very widespread notion that it is not only very unhealthy, but one of the most pestilential places to be found, and thus most writers who have mentioned the climate speak of it. Residents of the Isthmus, on the other hand, including the different medical men there, are unanimous in their assertions that it is not unhealthy. They maintain that they have fewer diseases on the Isthmus, and even proportionally fewer cases of malarial fever, than are to be met with in various portions of the United States, and not only fewer cases, but cases of less dangerous type. It would be uncandid not to mention that yellow fever has at various times been prevalent on the Isthmus, and that when met with it has occurred as an epidemic of severe type; during the last one (which occurred in 1868) from 75 to 80 per cent of those attacked succumbed to the violence of the disease. From as extended an observation of the country itself as I could make, from information derived from the statistics for the last three years of the medical service of the Panama Railroad Company, and from conversations with different medical men there I have reason to believe that the statements of the residents of the Isthmus as to their climate are substantially correct, as far at least as the towns of Panama and Aspinwall are concerned.

It must be remembered, however, that malarial fevers are not usually met with in cities, and that the use of quinine as a prophylactic is there largely resorted to. In the smaller native villages, where this is not the case, fever of a violent type is very common, deaths occurring frequently. The conclusion, therefore, seems to me evident that malaria is everywhere present on the Isthmus, less so in the cities, but that its ill effects can to a great extent be prevented by the use of small daily doses of quinine, with the observance of various hygienic rules, the use of flannel next the skin, the avoidance of the use of intoxicating drinks, and of exposure to the open air during the morning and evening, being careful to avoid exposure after extreme fatigue from any cause. With this care I am satisfied a long time may be spent on the Isthmus

with but little detriment to health; without such precaution, however, the effects of the climate are speedily shown, being first manifested upon the nervous system, langor, lethargy, loss of appetite being almost immediate results, fever and disease of the digestive organs following surely in due course of time. To conclude, it seems to me that *the* most practical point of this inquiry is, whether in case of a ship canal being built across the Isthmus passengers would be exposed *in transitu* to malarial diseases? In view of the facts already noted, this seems to admit, without further argument, of a ready answer in the negative.

ISTHMIAN CANAL COMMISSION—THE REPORT OF THE DARIEN SURVEY, EASTERN DIVISION, 1899-1900—BOYD EHLE, PRINCIPAL ASSISTANT ENGINEER.

* * * * *

ENGINEER EHLE'S REPORT.

The Caledonia depression.—Rio Caledonia empties into the bay in front of its main entrance from the sea, where there is least protection from the surf caused by the northerly trade winds. From the shore, and perhaps half a mile inland, the formation is coralline, slightly covered by the débris of the river. At a point about half a mile inland the valley becomes very decided, with a general width of about 1,000 feet, this width continuing to the "forks," at about $4\frac{1}{2}$ miles from the river's mouth. The river here divides into two branches of nearly equal volume. The one coming from the southeast rises in high hills, and its valley—a veritable canyon—is broken by many cascades filled with huge bowlders. The trend of the valley is somewhat parallel to the divide, and offers no evident chance for an economical canal location. This river is probably the one that caused Gisborne's error. The other branch of the main river lies in a southwesterly direction—nearly at right angles to the divide—with a wide valley nearly similar to the main river for about a mile above the "forks," where it reaches the foot of the divide. There is a short, steep ascent in less than 1,000 feet from the creek bed to the divide's lowest point—683 feet elevation—and then comes the gentle incline of the Pacific drainage.

* * * * *

The Aglaseniqua Gaps.—The Rio Aglaseniqua empties into Caledonia Bay about a mile northwest of the Rio Caledonia, and is of smaller size. The general trend of the valley is east and west. Its watershed was fully developed by the surveys of party No. 1, showing that the depression made by its headwaters in the divide are at greater altitude than at the Rio Caledonia; also that the depressions have greater altitudes as they are farther away from that gap. The first two saddles are about 750 feet elevation, the next about 815 feet, then one over 1,000 feet, etc.

* * * * * *

The Carreto Gap.—As this depression appears very low from the sea, a detailed examination of this vicinity was made, but this developed no advantages over the Caledonia Gap. Carreto Bay is well protected and has sufficient depth. The valley of the Rio Carreto is quite wide for several miles and then narrows to a rocky gorge that offers small chances for a canal location. The ascent from the river to the divide, with its least elevation 815 feet, is very steep; but then there is a flat slope to the Rio Chucunaqua. There is greater width of the Isthmus than at Caledonia Gap.

The Sassardi Gap.—A view of this depression from the sea suggests better possibilities than are realized after a detailed investigation. The Rio Sassardi enters Caledonia Bay in its northerly part, opposite a channel out to sea. There is a coastal plain over 2 miles from the beach which can be crossed in any direction with a canal line with but light work. Then the valley of the Rio Sassardi is badly broken by two interlocking spurs, which can not be passed by the easy curves necessary for a canal. The valley beyond this point is favorable for about a mile, and then its tortuous course renders it unfavorable for canal purposes. From the river the Atlantic side of the continental divide is very steep. The least elevation in the depression is 1,098 feet, and from this point there is a steep descent to the Rio Morti. There is a clear view down this valley; and the Chucunaqua-Sabana divide appears as a flat, and beyond this was a low divide, probably in front of the Pacific Ocean. On a projected canal line through the Rio Sassardi and Rio Morti valleys, and crossing the low divide to the Rio Sabana, there would be a very short distance between tide water—probably the shortest distance on the continent.

* * * * * *

San Blas depression.—A detailed examination of the region of possible feasibility for a canal was made extending along the divide between the high hills. The point of least elevation, 956 feet, is at the headwaters of the most easterly branch of the Rio Carti. There are two other well-defined points of low elevations, one on either side of this low Carti pass. The one at an elevation of 994 feet, made by the headwaters of the Rio Samgandi, a tributary of the Rio Mandinga; the other at an elevation of 1,070 feet, made by a branch of the Rio Carti. The narrow tortuous valleys of these streams offer serious, if not prohibitive, difficulties to any canal scheme.

* * * * * * *

Divide and Chagres Valley reconnaissance.—This survey, to prove the existence or nonexistence of a low gap between San Blas and Culebra, and incidentally developed portion of the Rio Chagres watershed for hydrological studies, has given what seems to be conclusive data. The divide is everywhere at a height greater than at Culebra or the San Blas gaps.

* * * * * * *

GENERAL OBSERVATIONS.

* * * * * * *

It is curious to note how the animal trails followed the valleys and crest of ridges on the easiest lines of progress. The Indians in former days decided for themselves their lines of transisthmian communication with least work to their physical energies, in so successful a way that they were adopted by the conquering Spaniards. The tendency of primitive people is toward water communication as much as possible. This did not, however, lead the Indians astray on the Isthmus for they gave to the Spaniards the trails across the divide at Carreto, Caledonia, and Sassardi, and these are used to this day.

The routes via the Rio Atrato received no favor from the early Spaniards or their followers, yet on these originated the supposed "mystery of straits," and it can not be doubted that canoes and boats have been passed from the Atlantic to the Pacific. This manner of communication is merely a curiosity without any value for the demands of the present. Balboa's expedition from Caledonia Bay to San Miguel Bay

constituted the first recorded interoceanic survey of a route that has retained its fascination with the present generation of engineers. The Panama route was of a later date, the communication being then with Portobello on the Atlantic coast, for which a paved highway was constructed. With the coming of the Spaniards began the collection of data which at the present time offers much to the engineer student. Our efforts have added to these records extensive detail data regarding the more evident portion of the region of probable canal feasibility—referring to the vicinity of San Blas and of Caledonia.

The divide lies very close to the Atlantic coast all the way from Mandinga to Cape Tiburon and then, rising considerably in elevation, crosses in a southwesterly direction to the Pacific Ocean.

* * * * * *

INCIDENTAL.

The Isthmus of Darien extends from near San Blas to the Rio Atrato Valley, lying almost wholly in the province of Panama, Republic of Colombia; a narrow strip along the Gulf of San Blas is part of the province of Colon. In our field of operation on the Atlantic side of the divide the country was much broken up by a complex network of spurs. The watershed is very limited and there are no streams worthy of the name of river. Part of the narrow coastal plain is coralline in structure. A thick forest, abundantly tangled with vines, covers the whole surface of the country and is of such rapid growth that it easily holds in check the feeble efforts of the Indians at cultivation. The soil is, in general, a reddish clay overlying massive rock of volcanic origin, which can be seen exposed in the creeks. These rocks, of an eruptive character, are usually known as "trap," and for our purpose it is not necessary to go into the complex geologic or mineralogic terms. It is very probable that the rock could be easily excavated by machines, but would be of little value for structural purpose on account of its tendency to disintegrate on exposure to the air. Syenite, granite, and sandstone were found in small quantities, but it is possible that exploration might develop beds of these. Many crystals and traces of iron and copper are found in the creek beds,

but nowhere did we observe any evidence of gold, and the Indians did not seem to have any native precious metals in their possession.

Along the coast from Caledonia Bay to San Blas Point there is nearly a continuous string of islands and reefs, which protect the shore of the mainland from the effects of severe storms and afford many safe anchorages. The islands are coralline in structure, and are covered thickly with cocoanut palms which yield superior cocoanuts. Along the coast from San Blas to Cape Tiburon there is a current of about 2 knots per hour. At Cape Tiburon this usually meets the waters of the Rio Atrato, if in flood, and is deflected across the Gulf of Darien and along the coast toward Cartagena. This coast-wise current proved very annoying in our trips with sailing vessels when opposed to its force, especially in the rainy season after the northerly trade winds have ceased, and there are calms of considerable duration. At such times our sloop and schooner would helplessly drift with the current. During the suspension of the trade winds there are fitful shore and sea breezes, usually at night, that would help us in sailing.

The winds of the rainy season come intermittently as squalls, which are dangerous to sail vessels in their fierce outbursts, unless quick and sufficient preparations are made for their coming.

There seems to be no evidence of recent volcanic action or records of earthquakes.

Climate.—There are two seasons on the Isthmus, a wet and a dry. Their duration is not well defined, but usually the former lasts from May until January. During this time there is a suspension of the northerly trade winds and showers are very frequent, the rainfall probably approximating slightly more than half that at Greytown, Nicaragua. During the “dry” months there are usually light rains in the mountains each night. The temperature is very even, usually not varying more than 15° during the year between the limits of 75° and 90° F. In the forest this temperature is delightful, and on the high hills the evenings are cold enough for blankets. The climate did not seem to have any deleterious effect by itself, and with proper sanitary discipline it would probably not be disadvantageous for construction work.

Inhabitants.—The Indians of the Atlantic side of the Isthmus of Darien make their homes on the coast, or preferably the islands, and cultivate, in haphazard way, small patches of land on the coastal plain or river valleys, gather cocoanuts, and fish. Their features are of Indian type, but physically they are inferior to most Indian races. They are apparently losing in numbers, due to mortality among the children. This is not suprising after seeing the insanitary conditions of the villages. The men are very proficient in sailing or handling the dugout canoes that they fashion with much skill. In these they live most of the day, fishing, getting cocoanuts, or trading. Small trading vessels frequent the coast and exchange cloth and simple articles for cocoanuts and tortoise shell. The men seem to prefer the blue cotton cloth, but the women array themselves in gay yellow and red. The former wear large rings of a copper alloy in their ears, and the latter, in addition to these, have them in their noses, usually elongating the cartilage. There does not seem to be any definite tribal government, but each village has its chief, councilors, and a policeman who carries a carved staff of office. Coronel Inanaguina, with whom our treaties were made as head chief, is a creation of Colombian influences, and the Indians, except near Sassardi, his home, did not seem to know or respect him. The whole Atlantic side of the Isthmus is uninhabited except these few people who live in their palm-thatched villages along the beach or on the islands.

There are Indians on the Rio Morti and Rio Sucubdi who come across the divide to the coast to trade. The coast Indians seem to stand in great awe of these people and explained their unfriendly attitude toward us by their dread of punishment by the mountain Indians if they welcomed us. The coast Indians are peaceable and never committed any overt act during our stay, but their fears, which were those of childish instinct, kept them restless until our departure. Their dread of aggression is rightly inherited from their ancestors, who were ruthlessly sacrificed to the greed of the Conquistadors. While this feeling lingers with the old men, who always govern in the villages, it is apparent that many of the Indians are less conservative. Some speak the English language quite well, on account of visits to

Colon or having shipped as sailors. It is probable that the Indians will long retain their land, as there are no resources to tempt the foreigners. There does not seem to be any intermarriage of these people with other races; any attempt would undoubtedly bring dire punishment. Medical treatment is very primitive and the Indians at times resort to incantations to heal. They appreciate the foreign doctor beyond their medical men, and were not slow to ask for much aid. Apparently any religion they may have had is now very slightly, if at all, observed. The Catholic priests of former days seem to have made no important impressions of their creed. To-day the Indians have many curious carved wooden idols, and not only lack reverence, but at times will barter them. Plantains, fish, and land crabs are the main articles of diet, and these are subjected to very primitive cookery. The Indians practice monogamy in their marital relations and the son-in-law must serve the father-in-law for a certain period or give sufficient goods for his bride.

Health.—It is probable our expedition would have as much or more sickness in most parts of the United States. The boils and sores that proved so troublesome were due to dietary indiscretions, poor cooking, and wading in the water. A few light cases of malarial fever yielded very rapidly to simple treatment. The exhausting hill climbing and packing of provisions told heavily on officers and laborers and made the way for the sickness with which we were afflicted. The Indians after they pass childhood seem healthy and live to a considerable old age in spite of their slight attention to sanitary measures.

* * * * *

Supplies.—Where provisions must be packed by laborers it is doubtful if so extensive rations are advisable, and it would be better to limit according to food values and bulk. Rice is the great food of the Tropics, and together with plantains should form the bulk of rations for officers and laborers. The effort to have them use corn meal was a failure; it was too heating for the Tropics. Neither did mackerel appeal to the Colombian laborer's palate. Our cooks—mere water boilers—were to blame for many stomach discomforts, as they had to swim everything in grease. Many of the men suffered inconvenience from a lack of proper personal equipment, and this matter is discussed in Doctor Wickes's report.

His remark in regard to the necessity of a physical examination of men for such expeditions is very pertinent, as persons of physical inferiority certainly are a drag to progress, and then life is not a pleasant one in the severe demands of tropical surveys.

* * * * *

Labor.—The progress of our surveys were greatly limited by the inefficient native Colombian labor, and it has never been my misfortune to meet worse. We were, of course, limited to the men along the coast, and on account of the civil war most of these were hiding from military conscription. These men seemed to have little idea of patriotism, were indolent and capricious. The few men that filtered through from the interior were always noticeable as of superior character. While the wages paid (20 pesos Colombian silver per month) were far in excess of country rates, and they were fed with lavish generosity and even clothed, yet all these they failed to appreciate when they were coupled with work; rather the hand-to-mouth living and the continual siesta, while clothes were not thought a necessity of the Tropics. All laborers had to be advanced money before they would think of going with us, but they were faithful to this obligation.

* * * * *

We could not prevail on the San Blas Indians to work, but this was not entirely due to aversion to labor, but partly in conformance with their uncompromising attitude of not rendering us any assistance.

* * * * *

Camps.—It was impossible to find thatching for shacks in abundance, as in Nicaragua, forcing us to provide tents, or, rather, large canvas tarpaulins were used. As these were not painted or otherwise treated they deteriorated rapidly from mildew.

* * * * *

TRANSITMAN C. P. HOWARD'S REPORT.

* * * * *

We reached Cartagena, Colombia, November 16. A revolution was then in progress, and with difficulty a small force of laborers was secured to do the packing and clearing for

the expedition. November 24 we left Cartagena on the *Scorpion*, and reached Caledonia Bay the day following. The Indians who came aboard and hovered around were very much opposed to our landing. In consequence, landing was postponed until several consultations had been held with them, and a treaty finally arranged.

* * * * * *

Most of the work of both parties in December was confined to the country that could be reached from the camp at Caledonia Bay. Early in January, Mr. Ehle having arrived with a considerable force of men, our party moved camp south to the forks of Caledonia River, and about a month later to a site on the east fork, 8 miles by the river from the supply camp at its mouth, and $2\frac{1}{2}$ miles in a straight line from the nearest point of coast. March 13-14, camp was moved to the supply station at Caledonia Bay, and shortly afterwards to a site on the west fork of river. From these points as a base the Caledonia watershed was explored.

* * * * * *

The higher parts of the ridge were hard to reach on account of the rugged nature of the ravines, and the labor of cutting trails on ridges. It was necessary to camp near the summit, building booths of leaves. The correct ridge at certain points was hard to find, involving much experimental work. Except a few Indian plantations near the coast, the country is all forest. If it should be attempted at any time to trace the divide from Carreto east, it would be wise to make preparations to live on the country by hunting and fishing as much as possible, as, owing to the distance, it would be difficult to reach the coast.

* * * * * *

There was a considerable amount of sickness in the Caledonia camps, but nothing of a serious nature. Boils were very troublesome. When severe, they entirely incapacitated a man from work, especially those on the feet and legs. It was suspected that they might have been caused in part by the use of leggings during the earlier months of survey.

April 11 our party sailed from Caledonia to Carreto Bay, and commenced the survey of the watershed of Carreto River. Our first line followed the river in a southwesterly direction to an elevation of 395 feet, at a point where the river gorge

turns toward the southeast. Here we left the river, and going west crossed the divide at an elevation of 953 feet at a point 500 yards distant from the river. By another line, leaving the river lower down, we crossed the divide in a gap, elevation 815 feet, distant 1 mile to the northwest in an air line from the first gap explored. The last-mentioned gap is very low compared to the ground elevations on the Pacific side, where the stream falls off very slowly. We followed the water courses on the Pacific slope down to an elevation of 750 feet on bank of stream, at a point 4,000 feet from the first gap and 3,000 from the second, and considerably farther by the meanderings of the streams. The streams that flow from the two gaps unite and form one creek at a point a few hundred yards short of the farthest point reached. This low point in the divide corresponds to the gap in the horizon observed from the day before commencing the survey. It is about $1\frac{1}{2}$ miles southeast in an air line from the farthest point on the ridge reached by reconnaissance of the Caledonia watershed, the barometer elevation of which was 1,625 feet.

The upper part of the Carreto Valley or ravine is rough. The line of survey avoided a half mile of its course by a detour over a hill 650 feet high, the bottom of ravine being impassable at that point.

On completion of the Carreto survey, a stadia line was run to connect with the Caledonia surveys. We followed an Indian trail and the coast line to a point near Point Escoces, supposed to be the site of old Fort St. Andrew; thence across the bay and up a stream to a connection with one of the Caledonia lines. All lines on the Carreto survey were run by stadia measurements and needle bearings, elevations being taken with the level.

The conduct of the Indians at Caledonia Bay was in general indifferent. But during the absence of the *Scorpion* previous to March 14, the occasion on which we moved camp to the shores, much uneasiness was felt concerning their attitude. Our party did not come much in contact with them except by communication with the supply camp at Caledonia Bay. The Carreto Indians were friendly, a fact which was gratifying and of substantial advantage, in view of the supplies of fruit and occasional game which we secured from them.

* * * * *

REPORT OF MR. H. H. GRANGER, CHIEF OF PARTY NO. 3.

The working camp was located a quarter of a mile up the Nercalaqua River, with party No. 4 on the opposite or west side of the river. Here the fresh water was not affected by the tide.

* * * * * * *

The scope of the work hoped to be attained by this expedition had as a prime object of a more thorough exploration of the passes at the headwaters of the Carti River than had been accomplished by the earlier surveys.

* * * * * * *

The valley of the Carti River was reached in 7 miles by a broken line, following the most favorable ridges to facilitate our progress and to meet the requirements of a simple connecting line. These ridges were composed of rocky spurs reaching a maximum elevation of 420 feet, thinly covered with the residual yellow clay, but affording foothold for the enshrouding tropical forest that is existent from ocean to ocean. For the first mile and a half we covered the low and at times marshy coastal plain. This is the land on which the San Blas Indians make a futile effort to subdue the overwhelming tropical growth for the cultivation of the banana, cane, cocoanut, alligator pears, coffee, etc. At $3\frac{1}{2}$ miles from the beach we encountered an unmapped river of considerable size that flows directly to the sea. Camp No. 3 was established on the banks of the Carti, at an elevation of 60 feet.

* * * * * * *

The Carti River, here averaging 150 feet wide, was well suited to a meander line, though forcing the men to wade continually, but was impracticable for a packing trail. The laborers thus relieved from chopping were put to work clearing a more favorable trail along the crest of the ridges that held the general direction of the river. At points we were thus a mile away, but at intervals were forced in near the river by the larger tributaries, which was taken advantage of for camping ground, to be near the work.

* * * * * * *

After the bed of the river attained an elevation of 300 feet, the surrounding range of hills increased in height, towering up from the water's edge narrowing the channel to almost impassable rocky canyons through which the water

rushed with torrential force. This state of the river continued until the very headwaters were reached at the pass located at an elevation of 956 feet, and as measured by our traverse line 20 miles from the zero point on the beach. This summit proved to be the lowest of any subsequently discovered in this region.

* * * * * *

Climate.—At our beach camp it was generally hot and stifling, rendered burdensome by the mosquitoes at night, and a minute gnat at all times. Still the men in charge the of commissary camp and the doctor attached to our party became accustomed to these discomforts and remained there the season through without any ill effects from the location. When once an elevation of 100 feet was attained, or even 50 feet, a noticeable improvement was felt, the woods and soil laden with moisture had a decided tendency to modify and temper the rays of the sun. At night a light covering was always desirable and the mosquito nets were always used as a protection against heavy dews. At an elevation of 1,500 feet the atmosphere was invigorating to a marked degree, but usually toward sundown clouds heavily laden with moisture came rolling up from the Atlantic side, enveloping our camp in a dense fog, the dampness penetrating our clothing and bedding much to our discomfort. Our fieldwork, continuing from the middle of January to the latter part of May, was favored by the dry season; however, there was enough rain falling, usually a soaking shower once a week, to start all vegetation and thus keeping the ground saturated and giving rise to running rivulets in all arroyos even at the highest elevations. The continued healthfulness of our party was doubtless in a great measure due to the cool and pure water always at hand.

The San Blas Indians.—The small islands along the coast encircling Mandinga Harbor are clustered with the dwellings of a numerous branch of the ancient tribe of the San Blas Indians, which they inhabit to the exclusion of the mainland, thus obtaining full benefit of the cooling trade winds. Here in this isolated position they live a life of independence, with no restraint from the Colombian Government, claiming the mainland by family allotment, submitting to their tribal regulations peacefully, and having duly appointed executives. They are industrious to a marked degree, constantly fishing,

clearing up small patches for cultivation, or gathering the ripening fruits and nuts and disposing of the surplus in Colon in exchange for domestic necessities. They present a picturesque sight while skillfully handling their small canoes in the open Gulf or paddling up the navigable rivers.

* * * * *

As long as our camps were accessible from navigable streams we were frequently visited by curious groups of Indians, but were never molested by them further than missing a few tins of supplies that were left unprotected, for they were generally attending to their own affairs. These Indians will likely be permitted to retain possession of these islands for all time, for the interior is doomed to remain a wilderness.

* * * * *

REPORT OF MR. W. P. ALFORD, CHIEF OF PARTY NO. 4.

* * * * *

General report relative to the exploration of the Isthmus from the Mandinga Pass to the source of the Rio Chagres and down the river to Gorgona, on the Panama Railroad.

* * * * *

The object of this exploration was to * * * determine the existence of a pass in the Cordillera lower than 1,000 feet, if such a pass existed; also, to learn the general character of the topography, flora, and geology of this section, which has heretofore been an unknown wilderness.

* * * * *

While the laborers were packing provisions from the commissary I was personally occupied in exploring the valley to the south and on the Pacific side. This valley is a part of the drainage of the Rio Chepo, and the river is as large as the Carti. It heads due west in the high mountains, and as it does not appear on the map I assumed that heretofore it was unknown except to the Indians, and named it "Rio Gaston." The Butler River, shown on the Selfridge map, flows into this river to the south and east of the Mandinga Pass. I also followed the divide to the west for a distance of a mile and a half, and located our second camp close to a fine spring.

On Saturday, May 5, five weeks' provisions were at camp No. 1, and early that morning we broke camp and made our real start along the divide for the Chagres River.

The work was distributed among the officers and men, as follows: Myself and one native did the advance scouting, blazing the trail along the divide and determining as far as possible the most feasible path for a packing trail. Owing to the peculiar conformation of the divide along this part of the Isthmus, this work proved slow and exceedingly arduous. To find the divide and trace it, we were compelled many times to climb down from the summit of the high ridges to deep gorges, often 500 or a thousand feet deep, then slowly and with infinite labor follow up the stream to its source. This operation would be sometimes repeated on the opposite side, thus making doubly sure of our position; then cutting back along the divide to our trail, we were able to carry the advance scouting along the backbone of the Cordillera.

Owing to the almost impenetrable jungle vegetation, our progress was often slow, yet in the face of all the trying and fatiguing labor of tracing the continental divide, our progress averaged about 1 mile per day up to the time we reached the headwaters of the Chagres, on May 18.

* * * * * *

At every step of our progress along the divide unusual difficulties met us. The crest of the Cordillera from San Blas to the Chagres was covered with a mass of wet, slimy, creeping vines, binding the dense underbrush into a solid mass of undergrowth. The divide itself is an almost inexplicable factor in its erratic windings. The series of nearly parallel ridges running with the axis of the Isthmus form only so many links in the chain. These high ridges are connected by two traverse ridges, usually so low and obscure that their presence, even when the view is unobstructed, is uncertain, and at a season of the year when it rains almost every hour of the day it is impossible to know where or when to look for them. The advance work of cutting a path along the crest of the divide, and being able to follow it from ridge to ridge, is a most serious problem, and even when conditions are favorable, which seldom occurs, the work is most difficult.

The topography of this part of the Isthmus consists of three main ridges running approximately east and west with the Isthmus. There is a high mountain range lying between the Pacific and the Rio Gaston that swings to the north

near the head of the Rio Chagres and forms the Cordillera proper; also another range of mountains that runs out on San Blas Point and joins the main range near the same place as the range on the south. Between these three ranges there are innumerable spurs and low ridges, separated by deep gorges and narrow valleys. At the point where the mountain range on the south and from San Blas Point joins the Cordillera occurs the highest mass of mountains. This, as shown by the profile, reaches an elevation of nearly 3,000 feet. From the Mandinga Pass, at an elevation of 994 feet, the gradient is uniformly ascending to the summit of the mountain, and is indicated on the map as "Brewster Peak."

The flora of the divide is almost identical with that found at San Blas and other parts of the Isthmus, excepting possibly a less marked tropical vegetation. This can be accounted for by the higher altitude, and it impressed us as being more subtropical. There are few valuable woods aside from an occasional mahogany or cedar. The palm family is poorly represented. Only one species attracted our attention, and unfortunately only the local Indian name was secured, viz, "Palma amarga." This palm is peculiar in its giant leaves, which are circular and fully 4 to 6 feet across the solid central part, and from this solid part radiate long pendants, making the leaf fully 8 or 10 feet in diameter. The trunk is covered with a hairy fiber, which makes it appear much larger than it really is. This tree is only found in one small locality and at an elevation of about 2,500 feet. The geological formation is difficult to describe, owing to the fact that all rock exposed to the action of the atmosphere is rotten. A few general observations were made as opportunity offered. The rock formation is granite and composed of two principal varieties, namely, a dark blue and a variegated gray granite. Often these two kinds of stone would be found cemented together, with the line of demarcation cut sharp, while the mass itself was one. The most prominent feature noticed relative to the general character of the rock was its dip. This wherever its stratification was observable was found to dip toward the south or Pacific side at an angle of 10 to 15°. This observation was borne out by the fact that all springs on the Atlantic side are from 300 to 1,000 feet below the crest of the divide, while on the Pacific side water can often be found at the head of the water courses and within a few feet

of the summit of the backbone. Only in two instances did we find traces of volcanic action, and these were on spurs of the divide and might have been caused by a buckling, due to a sudden lift and cooling and then dropping to the normal level. It is safe to say that very little evidence of volcanic action is to be found between San Blas and Panama.

On reaching the summit of Brewster Peak, May 18, it was quite evident that at last we were in the watershed of the Chagres River. At this point the continental divide swings to the southwest for a distance of 2 or 3 miles, where it meets and joins a high mountain range, running parallel to the Pacific coast. From the top of Brewster Peak we had a fine view down a valley running nearly S. 60 W. As this was almost the first clear day since leaving the Mandinga Pass, it seemed quite providential that such an opportunity was offered to verify our position by surrounding conditions. Up to this time we had kept a rough traverse, that our location might be approximately known, and our position on the map so nearly coincided with our surroundings that we felt confident in our position. Other observations from this mountain developed the fact that the Mandinga River heads on the northeast side and the Rio Gaston on the south side, while the Rio Chagres finds its head near the summit on the southwest face.

Leading off from the mountain there is a long spur fully three-quarters of a mile in length, which leads down to the river on the north side. As the spur runs in the direction of the valley, we followed it down the river. Previously I had explored the stream and found it to be so hemmed in by perpendicular rocks that it was impossible to follow down the bed of the stream. Like all other water courses in this section the amount of water collected in a given area is surprisingly large, and when we reached the river scarcely 1 mile from its head, we found fully 10 cubic feet of water flowing per second and increasing rapidly as we went down the river. About one-half mile below this point, which is indicated on the map as Camp No. 6, the river narrows up, and for three-quarters of a mile there is a deep gorge, necessitating the cutting of a trail up an almost perpendicular bluff and down on the other side of the bluff to the river. Although the difficulties we had met on the divide had been many, yet their aggregate was less fatiguing than the work

of cutting a trail up these bluffs and around the gorges, which became so many and so difficult of passage that we were at one time tempted to leave the river for the hills, but this was abandoned after one trial, as it carried us a long way from the river. On coming back to the river we found another gorge just below which proved more serious to pass than any of the previous ones, as it was nearly 5 miles long. Repeatedly we had to cut a path up an almost perpendicular bluff, down over detached bowlders and through a labyrinth of vines, and as at this time we were, both officers and men, packing from 30 to 50 pounds on our backs, the labor can well be imagined. In this gorge the channel varies from 20 to 50 feet in width, and the depth of the water is from 10 to 30 feet. The appearance of these gorges indicates that the river is following a fissure, caused by an earthquake, which opened a huge crevice parallel with and along the north side of the divide. Up to this last gorge, named Danta Canyon, there were three considerable streams entering the Chagres—two from the north and one from the south. The most noticeable feature of these streams was the marked difference in the color of the water, as well as the marked change in the temperature. The streams from the south were all as clear as crystal and the water cold, evidently coming from high altitudes and running over a rocky bed. The streams entering from the north were all greatly discolored, having the appearance of swamp water, and the temperature was several degrees warmer. Why this difference should exist I am unable to state, as our observation from the top of the hills failed to locate any area sufficiently level to admit a swamp. The discoloration may be due to an alluvial soil through which the rivers flow. This can easily be, as there evidently is a section lying between the mountains forming the divide and the range that runs close to Portobello, where the rock is less pronounced, and consequently there is a greater amount of soil over the rock, through which the water finds its course.

From the source of the Chagres down several miles the river drops at the rate of 200 feet per mile, and then there is a uniform drop of 25 feet to the mile until we reach Santa Barbara, the upper gaging station. This rate of descent in the river makes a series of rapids. While not continuous, they are so close together that only a few hundred feet sepa-

rate them. The channel where the rapids are most numerous is filled with bowlders from the size of a man's head to the size of an omnibus. As the water rushes over and between the rocks it is churned into a white foam. The perpendicular rocks often compelled us to cross these rapids to gain a better footing on the other side. As some of the men were unable to swim, a sense of relief was always felt when all were safely across. Often long poles would have to be held out in the channel to give support to the weaker men, as the swift current would catch them in midstream. On several occasions the men and packs were completely submerged and had to be pulled ashore by the men holding the poles on the bank. Although these incidents were often dangerous, yet they furnished much merriment, which greatly relieved the monotony of the laborious work of packing and travel. This work was continued from May 18 until May 26, when the difficulties became so great that we determined to build rafts and, if possible, make greater speed even at greater personal risk.

On Saturday afternoon, May 26, after working our way over a high bluff and through an almost impassable canyon, we stopped and began the work of raft building. This proved less difficult than at first expected. Along the banks there were plenty of trees, known to the natives as "balsa," which make an ideal raft owing to its wonderful cork-like nature. The rafts were about 8 feet long and 5 feet wide, bound together by crosspieces securely pinned to the logs. Although these rafts were comparatively small, yet they would carry safely 500 pounds.

On Saturday morning, May 27, the finishing touches were given to the five rafts, and at 9 o'clock our baggage and provisions were securely lashed to the rafts, and the personnel of the crews determined by distributing the poor men among the experienced men. On the two rafts in the lead, and this position was maintained during the entire trip, were Mr. Philips, Mr. Coates, and myself, with two trusty natives. The two days on the rafts furnished many exciting incidents as we whirled in and out among the rocks or slowly poled our way through the still water. Often in shooting the rapids we would strike great bowlders in midstream, or at a sharp angle in the channel we would be thrown on the rocks, often with such force that we were unable to keep our footing and so would be thrown into the river; yet with all the many

upsets and duckings that we were subjected to we reached Santa Barbara safely and without any serious accidents. In looking back over the trip from the time we left the pass until we reached the gaging station, it seems almost providential that we escaped serious accidents and sickness. Our nights were spent in the jungle or on the sand banks, often without protection from the elements, and the days were passed in the most difficult work of climbing rugged hills and down gorges or in shooting rapids where boulders were as thick as pebbles. During this trip no signs of Indians were found, and as far as the observations of the party go, there are no Indians between the Gulf of San Blas and Santa Barbara on the Chagres River. There were many stories circulated relative to the Indians on this part of the Isthmus, and we expected to be fed on poisoned arrows and have the nights made hideous by the fear of massacre; but these stories were merely myths, emanating from timid people.

The animal life is exceptionally meager, even the ever-present monkey seems to feel lonely in the solitude of this vast wilderness. An occasional tiger track was the only indication that the animal lived at all in this section. The wild hogs, so plentiful in Nicaragua, are seldom found on this part of the Isthmus. Wild turkey and a large "pava" are found in sections, but not plentiful enough to be depended upon for meat. The "danta," or tapir, are numerous along the upper waters of the Chagres, and as they have never been hunted or disturbed by man, there was little difficulty in shooting them. There are very few snakes to be found in any place along our survey on the Nercalagua or the divide. Why this fact should be, not only relative to the snakes, but to all animal life, seems to be an unanswered question, unless it be the dividing line between North and South America in the animal and vegetable world.

REPORT OF DR. G. L. WICKES, SURGEON TO EXPEDITION.

* * * * *

(1) EFFECT OF CLIMATE.

During the dry season there were occasional heavy down-falls of rain occurring through the day, as a rule. After May 1 the bulk of the rain fell between sunset and sunrise.

The wetting from rain had little effect on the men's health, as they were continually wet from day to day from wading the mountain streams. Prolonged exertion when chilled by water-soaked garments predisposed one to slight febrile attacks and bilious fever. The danger of this was greatly lessened by a bath followed by a brisk rub down on the return to camp. The greater part of the work of the survey was done at an elevation of over three hundred feet, so the men were not exposed to the worst form of the tropical climate. The absence of swamps and mosquitoes at this elevation precluded the infection of malarial fever, while the dense growth of trees, vines, and underbrush was a complete protection from the sun. It can not be said that the men suffered much from the climate. Enervation and bilious fever were about all that could be charged up against it. The first was a natural and expected result, and the latter was due more to the lack of physical condition of some of the men than to the effect of the climate. None of the officers was subjected to a physical examination before starting for the Isthmus, and naturally many of them were ill-conditioned. Men who are at all inclined to stoutness do not stand hard work well in this climate. There was no case of isolation in any of the parties.

(2) SICKNESS.

(a) *Swamp sores*.—The affection locally known as “swamp sore” differs but little from the indolent ulcer in description, progress, course, and treatment. This, though a minor ailment, was the most annoying and frequent ailment with which the writer had to contend. The development of swamp sores depended on several conditions, as follows: In certain localities along the seacoast or in swampy districts biting insects became very numerous and troublesome. The itching occasioned by gnats, sandflies, and mosquitoes was at first slight and easily bearable. This irritation gradually increased in severity and became so unbearable that to refrain from scratching the points of the itching skin was eventually an impossibility. Many of the officers were unable to sleep until they had at first scratched the epidermis from the bitten area. Others would seek the same relief from the intolerable itching in their sleep. This resulted in numerous raw, inflamed surfaces which were prevented from healing through

the constant wading necessitated by the work of the survey. It was noticed that those wearing canvas leggings suffered most from swamp sores. Infection naturally followed the delayed healing of the primary abrasion. The ulcers were mostly confined to the lower limbs, though a few developed on the arms. They were not observed on any other part of the body. In appearance these sores resemble any small superficial ulcer. They are red, inflamed, irregular-shaped depressions, some round, others oval, and varying in size from that of a dime to a 25-cent piece. While actively inflamed the border and base is irregular and angry looking, but during the subsequent process of cicatrization they present a smooth punched-out appearance. The secretion is a characteristic, clear sero-purulent fluid which may be slightly sanguineous at times. This secretion is constantly collecting beneath a crust of false cicatrization which alternately breaks, discharges, and re-forms during the active stage of the sore. These sores may be single or multiple. As many as a dozen have been observed on one limb. They affect the skin and subcutaneous tissue, but go no deeper, their further growth following a lateral direction by continuity of tissue. A cure results in a pigmented scar bluish red or reddish brown which remains for several years. The treatment is the same as that for any infected surface, but difficult when the patient continues working. Rest and antiseptic dressings, daily, result in a cure from two weeks to a month, depending on the amount of tissue destroyed. When the patient continues working the rule should be antiseptic dressings twice daily, and the application of an impervious dressing of cotton and flexible collodion every morning. Prophylactic measures embrace the avoidance of being bitten by insects as far as possible and treatment to allay the irritation of the stings when they have occurred. When wading streams continually the clothing about the lower limbs should be as light as possible and canvas leggings should not be worn. The development of swamp sores also depends on the condition of the patient's blood. They were much worse in anæmic individuals and consequently worse for everyone during the process of acclimation. They were very general among the officers; hardly a man escaped them. The native Colombians were not subject to them.

(b) *Boils*.—Many men were temporarily incapacitated from duty from this cause.

(c) *Bilious fever*.—This was the most frequent serious illness encountered. The symptoms were headache, dizziness, loss of appetite, nausea, vomiting, constipation, and a constant temperature of 104° F.

(d) Contrary to expectations, very few cases of intermittent fever were developed among the officers. But two cases occurred in this party (No. 2), both of the tertian type and both yielding readily to the orthodox treatment of rest in bed and quinine sulphate administered twice daily.

(e) *Gusanos* caused universal annoyance to all of the officers. They resembled boils very much, from which they were differentiated as follows: The gusano is caused by the larvæ of some insect—probably the gadfly—hatching in the skin and forming a grub there. When squeezed the thin yellowish fluid always escapes from the apex of the tumor through a small aperture, which is constantly present. This is characteristic of the gusano. The grub is best expressed by squeezing, after the application of an impervious dressing.

(f) There was one case of acute lobar pneumonia, which after running a typical course came down by lysis. The patient was a native Colombian.

(g) *Infectious diseases*.—There was no yellow fever or smallpox in the vicinity of the various camps, and the Indians have no recollection of an epidemic of the former. At Carreto the Indian village was half depopulated by variola about ten years ago, and fully 50 per cent of the present inhabitants of this town bear the characteristic pitting on their faces to the present time.

The native Indians are subject to enteritis, dysentery, and measles, but none of the Americans or Colombians in party No. 2 were affected by these diseases.

(3) LOCATION AND SANITATION OF CAMPS—WATER SUPPLY.

Whenever possible the chosen camp site was located on the banks of a clear running stream. The best sites were on a slight grade, as better drainage was secured and drier camps resulted. Latrines were made by digging pits and covering fresh excreta with loose sand or dirt. These were situated from 50 to 100 feet from the camp proper. All other refuse was disposed of in a similar manner. The pits were located, of course, at a lower elevation than either the camp or the water supply.

The tent flies in conjunction with the rubber sheets suspended above each cot afforded ample protection from the heavy rains at night. Neither would have sufficed alone. The flies mildewed and became very leaky after two months' service in the brush woods. The water supply came from the small mountain streams and was invariably pure. Either boiling or filtering it were unnecessary precautions. To this purity of the water is ascribed the perfect freedom from enteritis and dysentery enjoyed by the men. Not a case of either sickness occurred after leaving Cartagena in this camp.

(4) DIET AND COMMISSARY.

Of the articles of food included in the commissary it can be said that most of them were healthful, palatable, and climate proof. There were a few exceptions, however, here noted. The allowance of corn meal per capita was too large; less than one-fourth of it was eaten. Canned tomatoes did not withstand the climate, and all were spoiled. The same was true of all the ham prepared in cottolene. The Imperial brand of cheese was the only variety that did not spoil. The men did not care for the salt mackerel, though it kept well; but bacon was eaten daily with relish to the end of the expedition. The men were generally affected by a slight distaste for food after several months' work on the Isthmus. Dilute whisky, sherry wine, or claret seem almost a necessity in small quantities. Heavy drinkers do not last long in the Tropics.

(5) PERSONAL OUTFIT.

For a six months' expedition:

Pocket case of toilet articles.	Large pocket knife.
Three towels.	One poncho.
One housewife.	Two rubber blankets.
Straw hat.	One rubber bag.
Felt hat.	One pair heavy leather slippers.
Two woolen overshirts.	One air pillow.
Two or three suits woolen under- wear.	One pair rubber overshoes.
Six pairs woolen hose.	One woolen blanket.
Two pairs duck hunting pants.	Mosquito net.
Soap box.	Canvas hat.
Fountain pen.	Three pairs heavy hunting shoes.
Stationery.	Handkerchiefs.
	Two suits woolen pajamas.

Few went to the Isthmus properly supplied with shoes. The best wading shoes did not last longer than two months, some but six weeks. Constant wading, cutting from rocks, and dampness resulting in mold were responsible for this.

(6) SURGEONS' OUTFIT.

The surgeons accompanying a party to the isthmus should be allowed a voice in the selection of the medicines and instruments. The following list comprises only articles that are indispensable:

One field case, with a capacity of three dozen bottles, and with ample room for the articles necessary, such as bandages, dressings, ointments, instruments, etc. The complete case should not exceed 30 pounds in weight. There should be an ample supply of calomel tablets, gr. $\frac{1}{10}$, and gr. $\frac{1}{4}$ solu. ipecac; quinine sulphate tablets; flexible collodion and camel's hair brushes; one pocket case of instruments; one hypodermic syringe and outfit; three fever thermometers.

A sufficiently varied supply of medicines and surgical appliances to meet the occurrence of diseases of the Tropics and possible accidents.

As far as possible all medicines should be in tablet form and in well-stopped bottles. All gelatin capsules spoil rapidly.

The instruments need constant care and oiling to protect them from rust, which forms very rapidly.

In the description of the diseases in this report encountered on the isthmus I have given the greatest prominence to those that gave us the greatest troubles without regard to the seriousness of the malady.

No serious accidents occurred in party No. 2. No diseases more serious than malaria and bilious fever was developed among the officers of the expedition. There was an entire absence of diarrheal dysenteries owing to the sanitary precautions and splendid water supply.

Native fruit in small quantities did not disagree with the men.

INDEX.

	Page.
Afuera Island.....	100
Aglaseniqua gaps.....	249
Agua Dulce, village.....	163
Alford, W. P.....	260
Almirante Bay.....	25, 174
Sailing directions.....	31
Anachucuna Bay.....	81
Ancon, mountain.....	191, 215
Animal resources.....	206, 266
Anton, town.....	163
Anton-San Carlos trail.....	184
Arena Bay.....	101
Aspinwall, city. (<i>See</i> Colon.)	
Aspinwall, William.....	185
Asylum of San José de Malambo.....	161
Atlantic coast, description of.....	23
Atrato River.....	82, 134, 211, 216, 230, 232, 239, 334
Bar at the mouth of.....	239
Aztec.....	197
Bahia Honda (deep bay).....	98
Bananas.....	208
Baraco Island.....	88
Barbacoas.....	190
Barbacoas Bridge.....	153, 190
Barry Rock.....	130, 132
Bas Obispo, railroad station.....	188
Bastimentos Harbor.....	67
Bastimentos Island.....	67
Batele Point.....	112
Bayano River.....	14
Bayoneta Island.....	138
Bays and gulfs.....	23
Belen River.....	5
Bellenita, port.....	175
Bello, port. (<i>See</i> Portobelo.)	
Bluefield Creek.....	40
Bluefield Point.....	39
Bluefield Rock.....	40
Boca (La), port.....	146, 156
Boca Brava.....	88
Boca Channel.....	113
Boca Chica, channel.....	88, 91, 92, 130, 131

	Page.
Boca Chica, village, supplies	91
Boca del Drago, channel	24, 174
Boca Grande, channel	131, 132
Boca del Toro, channel	27-28, 164, 174
Boca San Pedro, channel	85
Boca wharf	113
Bohio Soldado (<i>see also</i> Buhio Soldado)	188
Boils	256, 268
Bolano islets	88, 90
Bolivar Asylum	161
Bona Island	110
Boguerones Point	67
Brava Island	88, 91
British consular reports for 1890; Colombia	164
British diplomatic and consular report (1899)	164
Bruja Point	93
Bruja Rock	93
Buenaventura, port	175
Buenavista Point	131
Buey Bank	127
Buey Point	114
Bugaba, town	164
Buhio Soldado (<i>see also</i> Bohio Soldado)	152
Bulletin, Bureau American Republics	164, 204-208
Buppan Bluff	47
Buppan Peak	47
Cables	195
Calawawa River	48
Caledonia Bay	134
Caledonia depression	248
Caledonia Harbor	77
Callao, port	175
Camps	255, 269
Caña River	46
Canal	125, 134, 164, 174, 189
Cost of Panama	174
North entrance	189
Route	124, 134
San Blas route	124
Candelaria Bay	84
Candelaria River	49
Cape Mala	109
Cape Tiburon	81
Capira Mountain	183
Capira River-Chorrera trail	183
Carre Island	90
Carreto Bay	256
Carreto Gap	249
Carreto, port	80

	Page.
Carreto River	257
Carreto Shoals	81
Carreto Valley	257
Carti River	250
Casaya Island	138
Cascadas (Las), railroad station	187
Casma, port	175
Castle Choco	50
Catalina Hills	48
Cauro Point	24
Cayo, port	175
Cebaco Island	105
Cedar Island	130
Census	196
Chagres, city and port	5, 6, 54
Chagres River	14, 15, 53, 190, 250
Reconnaissance	250
Chalk	204
Chamé Bay	110
Chamé Island	111
Chamé—Not a trail	184
Chamé, plains of	184
Changuinola River	174
Chapera Island	138
Charitable institution in Colon and Panama	160
Chepe River	11
Chepillo Island	125
Chepillo River	125
Chepo	180
Chepo River	124
Chepo road	180
Chichime Channel	72
Chile, steamship communication with	174
Chiman Range	221
Chiman River	125
Chiman village	181
Chimbote, port	175
Chimno Bay	88, 89
Chinche Bay	99
Supplies	99
Chinche Islet	99
Chipigana, town	132-134
Chirica Mola River	34
Chirica Mola settlement	34
Chiriqui Lagoon	33, 38
Chiriqui Rocks	42
Choco castle	50
Chorrera to Capira River, trail	183
Chucunuqua River	13, 133, 137

	Page.
Chuchegal Bay	90
Ciudad de David	86
Clearing marks	138, 141
Climate	15, 62, 107, 118, 221, 247, 252, 258, 266
Darien	133, 201
David, city	87
Panama, city	62, 118
Coaita Point	48
Coal, mines and facilities	120, 203, 204
Cocoa	207
Coclé River	15
Coclet Mountain	51
Coclet River	51
Coffee	207
Coibo Island	92, 100
Colombia	6
British, diplomatic and consular reports	20
Bureau of American Republics	15, 22
Colombia—Isthmus trails	189
Colombian line	174
Colon, city	60, 149, 188
Light	58
Limon or Navy Bay	58
Ports, breakwaters, etc	143
Colon—Panama trails	189
Columbus Island	26
Commerce	144, 152, 165
Commerce, Panama	121
Commissary	270
Communication	164
Communication, interior	214
Compagnie Générale Transatlantique	174, 179
Conception River	50
Congress, Latin-American	7
Confederation Granadina	9
Consuls, Panama	123
Contreras Islands	93
Copper	203
Corazal, railroad station	187
Cordillera de Bando	11
Cordillera de Chiriqui	12
Cordillera de Veragua	50
Cordilleras	219
Cordilleras Lloranes	219
Corro Azul, port	175
Cruces—Gorgona road	179
Cruces—Panama road	179
Craw Cay Channel	31
Cué River	134

	Page.
Culebra Island	112
Culebra, town	155, 187, 189, 190
Curari poison	241
Currents, Gulf of Panama	109
Damas Bay	100
Supplies	101
Danaide Rock	115
Danta Canyon	264
Darien Canal route	135
Darien Gulf	81, 134
Darien Harbor	131, 132, 133
Darien, Isthmus of	5, 6, 227-229
Climate	133
Productions	133
David Bay	88, 89, 92
David, city	86, 163
David—Panama road	181
David River	91
Deer Islet	90
Diet	270
Directory of American Republics, Commercial	178, 192
Directory of Panama	14, 15, 146, 149, 162, 209, 210, 217
Diseases	235, 236
Divala, town	163
Divide, journey along	264
Doguado and Napipi canal route	238
Duarte Islets	66
Duartis Point	105
Edith Island	132
Educational statistics	217
Ehle's report	248
El Jueo. (<i>See</i> Jueo.)	
El Pozo. (<i>See</i> Pozo.)	
Ellen Island	131, 132
Emperador (or Empire), town	155, 187
Engineering magazine (1900)	19
Escoces Point	79
Escoces. port	6, 79
Escondido, port	81
Escribanos Bank	71
Escribanos, harbor	70
Escribanos Shoals	71
Escudo de Veragua	45
Esmeraldas, port	175
Espinor José Domingo	7
Eten. port	175
Evaporation	234
Exports	208
Farallon sucio rocks	66

	Page.
Fauna	21, 266
Fever	269
Flamenco Island	112
Flora	22, 262
Foley Rocks	131
Forests	232
Frailes Islets	106
Frenchman Creek	36
Frijoles, town	153, 188
Water supply	153
Fruit	208
Fuel	205
Galera Island	139
Gamboa, town	155
Game	266
Gami Island	88
Garachiné Bay	129
Garrote Harbor	67
Gaston River	260
Gatum, village	152, 188, 190
Geological features	206, 226, 237
Gobernador Island	105
Gold	203
Gold River	50
Golden Island	134
Goleta (La), village	110
Gorda Point	97
Gorgona, town	154, 179, 188
Gorgona-Cruces road	179
Graham Point	132
Grande Island, light	69
Granger, H. H.	258
Green Islet	64
Grono Rock	89
Guarida Point	98
Guayaquil, port	175
Guinea Point	112
Gulfs and bays	23
Hamburg-American Packet Company	174, 179
Handbook of Colombia, Bureau of the American Republics	17, 143
Harbors	221
Harris, Captain	134
Harrison Line	174
Hay-Herran treaty	9
Health	234, 235
Hermanos Rocks	114
Herrera, Colonel	8
Holandes Cays	74

	Page.
Holandes Channel	72
Hospitals, Panama	119, 160
Howard's report	255
Huarmey, port	175
Huasco, port	175
Hydrographic Office, No. 84, 1902	143
Ice	207
Iguana Island	109
Imports and exports	208
Incas	198
Independence of Isthmus	7
Indians	182, 198, 223, 224, 225, 230, 257, 259, 266
Infectious diseases	18
Inhabitants	196, 223, 229, 253
Indians. (<i>See</i> Indians.)	
Instruction, public	216
Interior of the Isthmus	215
Iron	203
Isla Grande light	69
Isthmus-Colombia trails	189
Italian line	174
Jeannette Island	131
Jicaron Island	103
Jones Islet	132
Jorey Island	131
Juco Point	89, 90, 91
King Buppan's Peak	47
Knocker Rock	115
La Boca, La Goleta, La Palma, La Pantila, etc. (<i>See</i> Boca, Goleta, Palma, Pantila, etc.)	
Labor	255
Ladrones, islets	92
Lakes	13
Landing places	215
Languages	196
Las Cascadas, railroad station	187
Lavadera Shoal	67
Lavandera Rock	91
Leggings	256, 268
Lime	204
Lime Point	24
Limones Bay	5
Linartes, islands	90
Lines of communication	164
Lion Hill	188
Little Toboga Island	176
Lower Obispo, station	155, 188
McGregor, General	6

Machine shops:	Page.
Pacific Mail Steamship Company	112
Panama	121
Majaguay Island	126
Mala Cape	109
Mala, Punta Mala pesthouse	160
Malaria	245
Mamei, railroad station	188
Mandinga Pass	260
Mangalee River	52
Mangue Island	126
Manta, port	175
Manufactures	206, 207
Manzanillo Bay	63
Manzanillo Island	58
Manzanillo Point	68
Mariato Point	105
Mary Island	131, 132
Matachin, town	154, 188, 190
Medical report, Darien expedition	242
Medidor Island	97
Melones Island	111
Merry, Capt. W. L.	177
Milne Island	131, 132
Mineral resources	203, 204
Mineral waters	203
Mines, coal	204
Miraflores, railroad station	187
Modern Panama	158
Monitas Islets	89, 91
Monkey Hill	189
Mono River	74
Monthly Bulletin, Bureau of American Republics	147, 179, 195
Montijo Bay	104
Montuosa Islets	92
Supplies	92
Morro Puercos	106
Mulatas Archipelago	73
Mules	206
Nahia, port	175
Naos Island	112, 191
Nata, town	163
Nata-Chamé trail	184
Napipi and Doguado Canal route	238
Napipi River	237
Navagandi River	74
Negroes	185
New Granada	6, 8, 9
Nombre de Dios	5
Nombre de Dios Harbor	69

	Page
North American Navigation Company	176
Nuevo. port	92, 94
Nuevo, pueblo	96
Obispo, lower and upper. towns	155, 188
Oro Island	177
Orology of the Isthmus of Darien	219
Orphan asylum	161
Otoque Island	110
Outfit	270, 271
Pacasmayo, port	175
Pacific coast	85
Pacific Mail Steamship Company	177
Pacific Steam Navigation Company	175
Pacora road	180
Pajaros Bay	97
Pajaros Island	126, 138
Palenque anchorage	89, 91
Paley Island	131, 132
Palma, village	133
Palms	207
Panama	5, 6, 8, 9
Boundaries	11
Mountain ranges	11
Panama Canal	61, 62, 122
Panama, city	117, 156, 179, 214
Anchorage	115
Light	116
Modern Panama	158
Port	115, 144, 174
Postal communications	120
Railroad	122
Steamer lines	120, 178, 179
Supplies	119
Telegraphs	120
Viejo (old Panama)	118, 179
Water supply	18
Panama-David road	181
Panama-Portobelo trail	189
Panama Railroad	120, 122, 185
Bridges	215
Concession for	135
Cost of	185
Description of route	186, 190, 198
Directors of	191
La Boca Canal, dredging	192
Pier	186
Plant	186
Stations, list of	191
Time table	193

	Page.
Panama Railroad Company's steamship lines	179
Pantila Islet	132
Paraiso, town and railroad station	156, 187
Parida Channel	88
Parida Island	87, 89
Anchorage	88
Sailing directions	89
Tides	91
Parita Bay	110
Passage Rock	141
Patena Point	129
Payta, port	175
Pearl Islands	136
Pearls	203
Pecuado, Doctor	198
Pedro Gonzales Island	139
Pedro Miguel, railroad station	187
Pelado Island	125
Peranchita River	134
Perico Island	112
Perry Bay	140
Perro Cays	71
Pescador Point	70
Pesthouse of Punta Mala	160
Petillo Point	114
Piedras and Perro cays	71
Pierce Point	128
Pilon de Miguel de la Borda Mountain	52
Pimentel, port	175
Pinos Isle	74
Pisco, port	175
Plantain Cay	44
Playa Grande Bay	90
Pasturage near the bay	90
Pneumonia	269
Poisoned arrows	241
Political table of Panama	210
Popa island	33
Population	196, 223, 229, 253
Between David and Panama	198
Indians	182, 198, 223, 224, 225, 230, 257, 259, 266
Talamancans	200
Port Carreto, Port Escoces, Port Escondido, Port Nuevo, etc. (See Carreto, port; Escoces, port; Escondido, port; Nuevo, port; etc.)	
Portobelo-Panama trail	189
Portobelo Point	66
Portobelo, port	6, 23, 63, 179
Position, defensive	187, 189, 215

	Page.
Pozo anchorage	91
Price Point	131
Prince Point	133
Products	201, 206
Promenades	161
Prosper Rock	93
Provision Island	27
Public instruction	216
Pueblo Nuevo	96
Puerto Escoces, Puerto San Lorenzo, etc. (<i>See</i> Escoces, port; San Lorenzo, port, etc.)	
Punta Mala pesthouse	160
Quibo Island. (<i>See</i> Coibo Island.)	
Races	196
Raft building	265
Railroads	185
Intercontinental	195
Panama Railroad. (<i>See</i> Panama Railroad.)	
Projected	195
Rainy season, Colon	62
Rations	270
Ray Island	131, 132
Remedios, town	199
Reports:	
British Diplomatic and Consular	164, 207
Commercial Relations, 1902	174
Humphrey, C. B., Captain, Twenty-second Infantry	143,
144, 145, 147, 151, 162, 179, 189, 206	
Intercontinental Railway Commission	13, 163, 181, 185, 200
Interoceanic Canal, 1901	174
Resources	203
Animals	203
Fuel and timber	205
Manufactures	206
Mineral	203
Products	206
Reventazoncs Shcals	77
Revenues	208
Revesa Bay	83
Rey Island	138
Rincon Point	51
Rio de los Indios	15
Rio Grande	184, 187
Rivers	13, 231
Roads and trails	179, 180, 181, 184, 189, 263
Robalo River	37
Royal Mail Steam Packet Company	179
Royal Mail Steamship Company	174
Sabana road	179

	Page.
Sabanilla Point	66
Saboga anchorage	137.
Saboga Island	137
Saino Island	91
St. Christopher Bay	51
St. Elmo Bay	139
Salmedina Bank	65
Salt	203
Samanco, port	175
San Blas:	
Canal route	124
Channel	7
Depression	250
District	164
Gulf of	11, 71
Indians	258
San Carlos, town	163
San Carlos-Anton trail	184
San Christoval Bay	69
San José Bank	136
San José Island	90, 91, 140
San Lorenzo Point	127
San Lorenzo, village	91
Supplies	91
San Miguel:	
Anchorage	139
Bay	127
Region	180
San Pablo, town	153
San Pedro Channel	88
Sanitary conditions, Panama	119
Sanitation	21, 269
Santa Cruz Point	89
Santa Maria River	133, 184
Santiago, town	163
Sasardi, bay and harbor	75
Sasardi Gap	249
Savannah Point	131, 132
Savannah River	132, 135
Scientific American	202
Scrubby Point	40
Sailing directions	41
Scruggs, W. L.	21, 196-198
Season, best for expedition	183
Secas Islands	92
Selaverri, port	175
Selfridge, T. O., United States Navy, report	219
Sentinela Island	98
Sevilla Islands	88

Page.

Sharp, Captain	134
Shepherd Harbor	29
Sickness	267
Snyder, N. T.	174
Soil	231
South American Steamship Company	174
South Forallon Ingles Island	126
Stanford's Compendium of Geography, Central and South America	14, 19, 22, 146
Stanley Island	130, 131, 132
Statesman's Yearbook	165, 208
Statistics, educational	217
Steamer lines, Panama	120, 178, 179
Strain Island	130, 132
Sugar cane	207
Sulphur rocks	115
Supe, port	175
Supplies	254
David	87
Panama	119
San Lorenzo	91
Sasardi Bay	76
Swamp sores	267
Swamps	190, 191
Table, political, of Panama	210
Taboga Rock	115
Taboga Island	111
Taboguilla Island	111
Talamancans	200
Talon Island	98
Taltal, port	175
Tambo de Moro, port	175
Tambór Island	68
Tavernilla, town	153, 188
Taxes	208
Techura, port	175
Telegraph	120, 195, 214
Tents	270
Terrin Point	70
Tiburon Cape	81
Tides:	
Chiriqui lagoon	39
Gulf of Panama	109, 116
Tiger breaker	43
Tiger cays	43
Tiger channel	37
Tiger Head	47
Tiger Rock	43
Timber and fuel	205

	Page.
Tirbi Point	20
Tobacco	207
Tobobo bank	44
Tobobo bight	44
Toro Point	57
Trails	179, 180, 181, 184, 189, 263
Trade, export	208
Transportation, mules	206
Treaty of 1846	8
Trevan islet	131
Trinidad River	126, 180
Tuira River. (<i>See</i> Tuyra River.)	
Tumaco, port	175
Tumbes, port	175
Turk Island	132
Tuyra River	13, 14, 132, 133, 134, 184, 216, 234
Ulcers	268
Upper Obispo, town	155
Urava Island	111
Vaguila Rock	132
Valiente Breaker	43
Valiente Cays	42
Valiente Channel	43
Valiente Peak	42
Valiente Peninsula	44
Valladolid Rock	111
Valparaiso, steamship connection with	174
Vampire bats	244
Vegetables	206
Ventana Island	91
Veraguas	5, 197
Virago Point	131
Virgin Point	129, 132
Viuda Rock (or Widow Rock)	89
Viveros Island	138
Volcanoes	12
Washington Island	130
Water:	
Drinking	179, 269
Mineral	203
Water Cay	34
Water transportation	174
West Indies and Pacific Steamship Company	174
Wharfage, Colon	62
Wickes, G L	266
Widow Rock. (<i>See</i> Viuda Rock.)	
Winds	77, 108
Woods	205
Zambú River	15
Zapatero Point	49
Zapatilla Cays	32



I MANUEL MARJA PAZ
BOGOTÁ

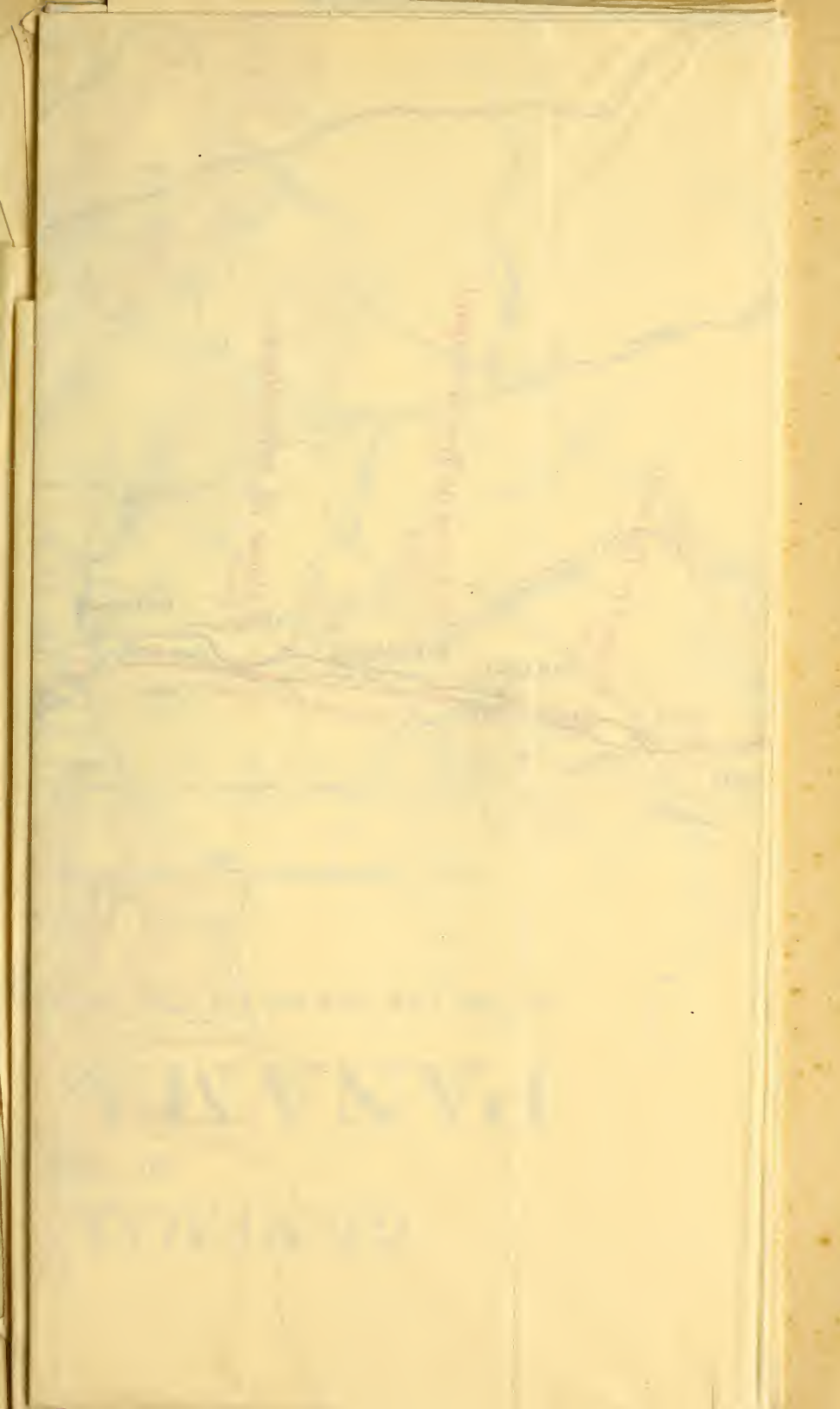
1864

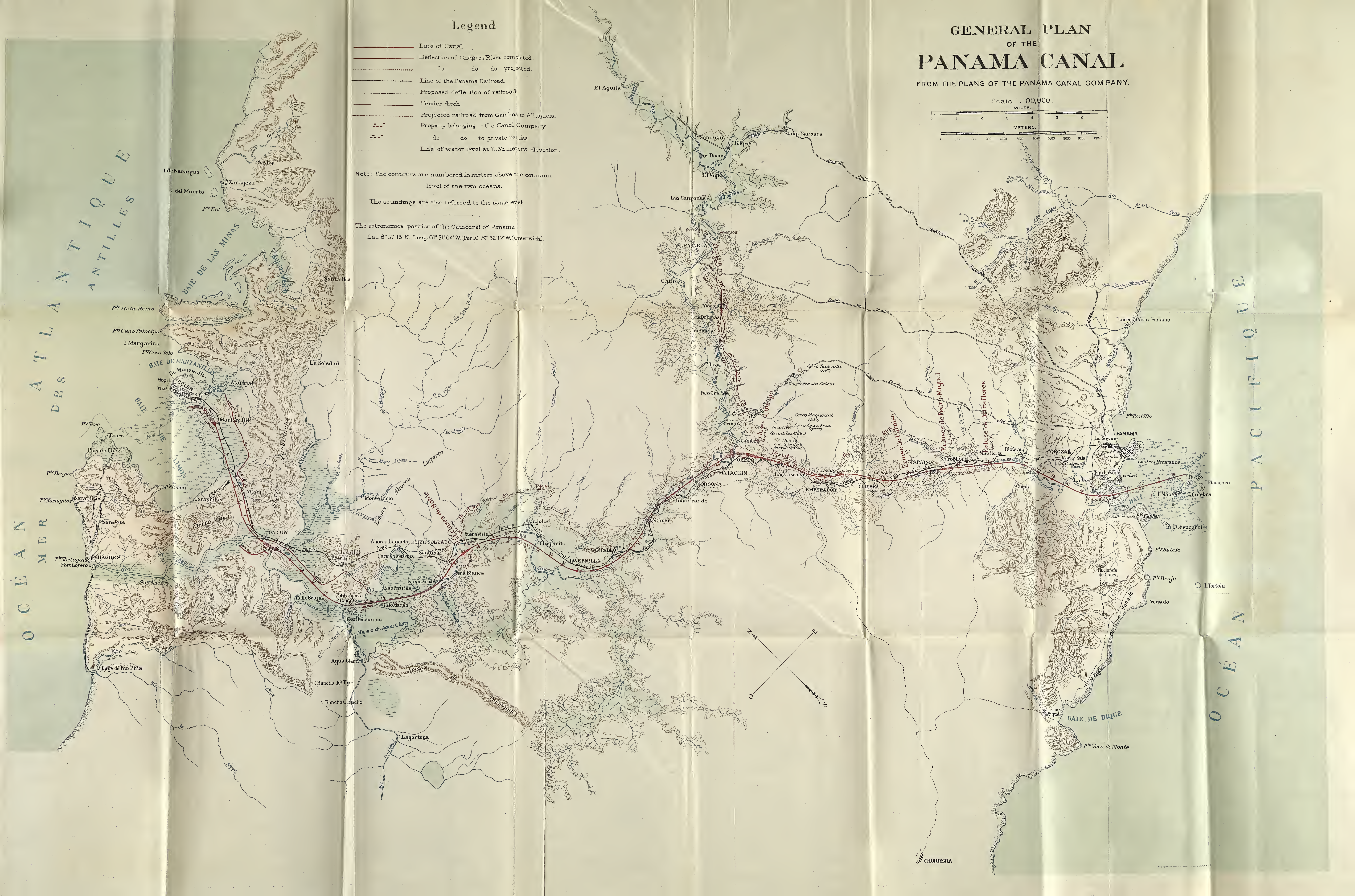
Toda la Costa correspondiente al Mar Pacifico, i desde la Punta Carreta hasta Punta Buena, en el Atlantico, ha sido fielmente tomada de las ultimas Cartas publicadas en Londres de orden del Admirantazgo ingles.

Архивизация граде-миле на восток.

0 1 2 3 4 5 6 7 8 9 10 miriades.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 antiguas leg.º granadinas
 $\frac{1}{810,000}$







Legend

- Line of Canal.
- Deflection of Chagres River, completed.
do do do projected.
- Line of the Panama Railroad.
- Proposed deflection of railroad.
- Feeder ditch
- Projected railroad from Gamboa to Alhajuela.
- Property belonging to the Canal Company
do do to private parties.
- Line of water level at 11.32 meters elevation.

Note: The contours are numbered in meters above the common level of the two oceans.

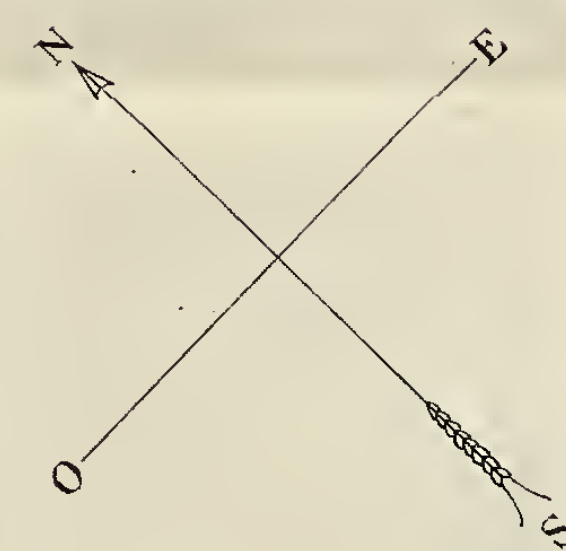
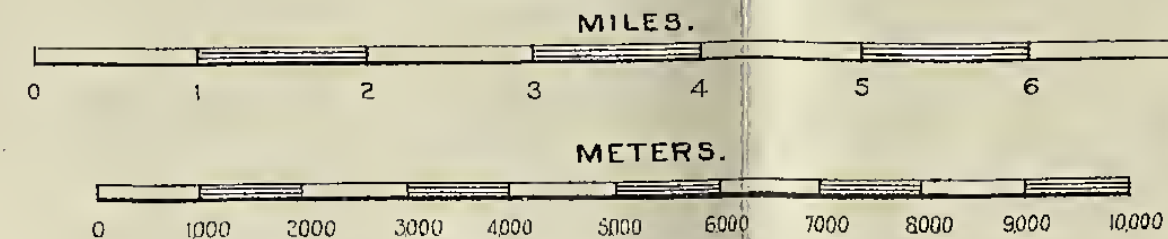
The soundings are also referred to the same level.

The astronomical position of the Cathedral of Panama
Lat. 8° 57' 16" N., Long. 81° 51' 04" W. (Paris) 79° 32' 12" W. (Greenwich).

GENERAL PLAN OF THE PANAMA CANAL

FROM THE PLANS OF THE PANAMA CANAL COMPANY.

Scale 1:100,000.



CHORRERA



WAR DEPARTMENT OFFICE OF CHIEF OF STAFF.
SECOND (MILITARY INFORMATION) DIVISION.
GENERAL STAFF.
No. 4.

SELECTED TRANSLATIONS

PERTAINING TO

THE BOER WAR.

April 1, 1905.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1905.

WAR DEPARTMENT.

Document No. 244.

Office of the Chief of Staff.

TABLE OF CONTENTS.

	Page.
German Tactical Ideas: The Influence of the South African War. Translated from the <i>Revue Militaire des Armées Etrangères</i> , for August, 1903, by First Lieut. Clarence O. Sherrill, U. S. Corps of Engineers	5
Notes on the Artillery in the South African War. By P. Van Berchem, Major of Artillery. Translated from the <i>Revue Militaire Suisse</i> , for January and February, 1903, by Capt. William Lassiter, Artillery Corps, U. S. Army	21
Experiences of the English in the South African War as Regards Clothing and Equipment. Translated from the <i>Quarterly of the German Great General Staff</i> (1903), by Capt. Jacob F. Kreps, Twenty-second U. S. Infantry	51
The late South African War and its Lessons. By Gen. H. Bonnal (French army). Translated by Second Lieut. Charles M. Allen, Artillery Corps, U. S. Army	73
The German Infantry Regulations, as Tested by the Experiences of the Boer War. By Lieutenant von Gentz, Second Lorraine Infantry. Translated from <i>La France Militaire</i> (June, 1904), by First Lieut. S. M. De Loffre, Assistant Surgeon, U. S. Army	119
Tactical Deductions from the Boer War. By Lieut. Gen. A. von Bo- guslawski (German army). Translated by Capt. Fredrik L. Knud- sen, Eighth U. S. Infantry	127
Bibliography of the Boer War.	
Index.	
Plates: No. 1. Battle of Colenso.	
No. 2. Action at Spionkop.	
No. 3. Action near Modder River.	
No. 4. Battle near Magersfontein.	

NOTE.

The following translations by officers of the Army in a measure reflect continental military thought with reference to the tactical deductions of the Boer war. Basing their opinions on the wars of Frederick and Napoleon, and the European experiences of 1870-71 and of 1877-78, as modified by subsequent improvements in arms and ammunition, French and German tacticians are loath to ascribe any serious revolution in tactical principles to the experiences of the Boer war; but rather that abnormal terrain, faulty handling, and widely divergent training, temperament, and armament of the opposing forces brought about unusual tactical maneuvers and formations which will not stand the test of future military operations conducted under normal conditions.

Doubtless the present Russo-Japanese war will decide, once for all, many of these tactical controversies. Meanwhile, until authentic and complete accounts of the campaigns in Manchuria are available for the military student, it will be interesting and instructive to form some idea of European tactical theories as affected by the Boer war, with a view to seeing how far they may be borne out by the present operations in the Orient. As an Anglo-Saxon people, having many similar institutions and racial characteristics, the study of the mistakes of the British army, primarily a volunteer army like our own, should be of more than ordinary interest; while the military successes and short comings of the mobile, poorly disciplined Boer militiamen—a militia of expert riflemen—should for obvious reasons be of value in outlining our future military policy.

The following translations are necessarily of limited extent. To the military student who would pursue the tactical study of the Boer war still further, the *German General Staff History of the Boer War* (translated into English by Col. W. H. H. Waters, R. A., C. V. O.), presents an accurate and highly professional narrative of the war, as viewed through German eyes; while the valuable French works of Langlois and Gilbert, and the German writings of Von Lindenau, and many others, entirely tactical in character, are available to students of these languages.

The Great Boer War, by A. Conan Doyle, and the *Times History of the War in South Africa*, give interesting accounts of the operations by nonmilitary writers; while the *Report of the Esher Commission on the Conduct of the War*, gives opportunity for reviewing the opinions of British participants as to the causes of success and defeat. From the Boer standpoint, *The Three Years' War*, by Gen. Christian De Wet, gives a good general idea of the fighting methods employed by the Boer commandos.

The thanks of the General Staff are due to the foreign authors and publishers of the following essays, more especially to Gen. A. von Boguslawski, of the German Army, and Gen. H. Bonnal, of the French Army, for courteous permission to publish translations of their valuable articles; and to the Librarian of Congress, for the complete list of the bibliography of the Anglo-Boer war, which follows the translations.

GERMAN TACTICAL IDEAS: THE INFLUENCE OF THE SOUTH AFRICAN WAR.

(Anonymous.)

Translated by Lieut. CLARENCE O. SHERRILL, Corps of Engineers, for the Second Division, General Staff U. S. Army, from the *Revue Militaire des Armées Etrangères* for August, 1903.

The events of the Transvaal have been frequently held out as a series of new and unexpected facts, demonstrating the folly of the present methods of fighting. It has been said that the frontal attack is impossible, even with greatly superior forces. Success was only expected with flanking movements, with a wide extension of the wings, threatening the flank, the rear, or, better still, the communications of the enemy.

Strategical offensive, tactical defensive was the secret of success.

The present methods used by European infantries met a sudden check and had to be entirely transformed.

As to the cavalry, it had made a failure. It was able to play only a secondary rôle in reconnoissance, and had to give up fighting on horseback.

It is proposed to show how the first two points, conception of the attack and the methods of infantry fighting, are viewed in Germany. The question of the use of cavalry will be the subject of a later study.

I.

In one of its last works^a on the subject of the operations in the East of the First Army of the Loire, the German General Staff expresses its opinion clearly as to the "strategical demonstrations," transformed into a tactical defensive.

"Every operation," it says, "was directed against a *ligne d'étapes*; that is to say, against nothing, and the results ought

^a *The Movements of Armies and Deductions Therefrom.* (Berlin, 1902.)

to forcibly show that a similar maneuver, so-called strategic, would be useless as long as the enemies' armies remained intact."

"It is easily understood," we read further on, "that Bourbaki had thought of the plan which consisted in taking position at Villersexel. But a mission having an offensive character could not be transformed into a tactical defensive."

"Each improvement in armament," says Balk in his semi-official course in tactics, "has conduced to the superiority of the defensive; but the army which has thought that it could give up the offensive spirit has always paid dearly for its error—the Austrian in 1859, the French in 1870, the Boers in 1900."

It is therefore by main strength that the Germans hope to win victory, and all their efforts tend to increase the power of their means of attack. But the attack is decided always, at a given moment, by a frontal action.

"In battle," writes Neckel, "even for divisions and army corps, there are only frontal attacks."

"After the Boer war," writes Boguslawski, "every attack was declared to be impossible. But the failures of the English are due as often to their bad dispositions, to the failure of energetic direction in the attacks, to their theoretical methods in no way appropriate to the conditions * * *. We believe that most of the time the result of the English attacks would have been the same in front of arms firing single shots, even when charging right up to the muzzles.

"If a combination of a flank attack with a front attack must be regarded as desirable," he adds, "it is wrong to consider the front attack pure and simple, as impossible, and the war of the Boers in no way permits our opinion to be contradicted."

Boguslawski therefore does not see in the failures of the English a new and surprising fact. For a century now, every compact formation falling suddenly under the fire of sheltered riflemen, at effective range, has been stricken with enormous losses. The *decisive range* alone has changed.

From 80 to 100 paces a century ago, it became 500 to 600 meters with the *chassepot*. It is now 800 to 1,000 meters. This is the only positive idea which the war of the Boers has caused to be, not discovered, but verified.

Lieutenant-Colonel de Lindenau is more affirmative even than Boguslawski, when he analyzes the battles of Magersfontein, Colenso, and Spionkop.

"These three battles," says he, "were pure frontal attacks. No attempt was made to combine an attack on the flank with the front attack. The British generals have been bitterly reproached in every language. This was wrong.

"The English generals decided on front attacks, because they were the only ones possible. To outflank the positions of the enemy was very difficult. The Boers mounted would prolong the threatened wing with their forces very weak elsewhere.

"Under these circumstances, *to throw back this thin line by a frontal attack was a very sane conception * * ** But the assailant made the mistake of exposing himself with similar fronts. We never see *the desire of acting against a particular point, with units well in hand, attacking with the whole strength, with a sufficient depth to insure the bringing up of the attack to its maximum power progressively.* He who wishes to attack, must decide to engage without reservation up to the very last man. It is only when the last reserve has been employed that the attack can be considered as having been checked. Now, at Magersfontein the English had only 65 per cent of their effective strength engaged; at Colenso, 57 per cent; at Spionkop, 47 per cent. The smallness of the losses is, besides, a proof of lack of energy in the attacks."

So, according to Lindenau, not only could the frontal attacks succeed, but they were the only ones practicable. It is only the bad methods employed and, a grave accusation, the lack of energy, which has caused their failure.

The greatness and the suddenness of the losses undergone by the English has frequently been pointed out as an explanation of the profound moral depression of the assailant, and it has been concluded that new efforts before an "invulnerable front" were useless. The German writers in general see the question from the standpoint of another period. Boguslawski, comparing the losses sustained by the Germans in 1870, to those of the English in the Transvaal, concludes that the effectiveness of fire on the field of battle has not been increased in thirty years.

"But," replies Caemmerer, "one must consider the small number of rifles engaged in front of the English, and the nature of the Boers' fire. Their fire is individual and has not the properties of our collective fire. The Boer chooses his adversary, watches him, and only fires when he is almost sure of hitting him. The relative smallness of the losses sustained by the English can be thus explained, and also how the latter were able to approach so close."

Perhaps their losses would have been greater in front of adversaries more numerous, and trained according to European methods. Perhaps these latter with less coolness might have opened fire farther away and have sent more bullets "into the air." In any case, we here enter the domain of hypothesis in face of which the facts present themselves with brutal force.

Notwithstanding the progress of armament, the per cent of losses sustained in battle constantly diminishes through the ages.

"The more the range of arms is increased," says Balk, "the greater the distance which separates the combatants, and the smaller become the losses. It is not in spite of the precision of the arms, it is because of it that the losses are actually less."

In support of his statement, he gives the following figures:

Percentage of losses on the field (victors and vanquished).

	Per cent.
Under Frederick.....	17
Napoleonic period	15
Crimean war	14
War of 1866	8
War of 1870:	
Before the fall of the Empire.....	9.5
After.....	3
Losses of the English at Magersfontein.....	7.4
Losses of the English at Colenso	5.8
For the battalions, suffering most at Magersfontein, the losses were 35 and 24 per cent.	

For the battalions suffering most at Colenso, 24, 16, and 13 per cent.

To these latter figures Balk opposes the losses sustained by certain French and German battalions in 1870:

The 18th of August:

Battalion of tirailleurs of the Guard, 44 per cent.

First Battalion of the Second Regiment, 55 per cent.

Fusiliers of the Eighty-fifth, 52 per cent in twenty minutes.

The 16th of August:

One-half battalion of the Thirty-fifth, 9 officers and 150 men (out of 400) in five minutes.

The 6th of August:

First French Tirailleurs, 53 per cent in fifteen minutes.

From the point of view of the severity of losses as well as of their suddenness, the events of the Transvaal offer, as we see, nothing particularly new.

The Black Watch and the Highlanders at Magersfontein, the three leading battalions of the Fifth Brigade at Colenso, can not envy the foot soldiers of the Eighty-fifth and Thirty-fifth German regiments, nor the French tirailleurs of the First Regiment.

Besides, the proportion of losses in 1870, before and after the fall of the Empire, shows eloquently enough the influence of the courage of the combatants.

Are the present European troops better than those of England? Perhaps they are no braver. They may be, at all events, better instructed, and, thanks to better methods, can preserve their morale more intact.

In judging the English troops severely, the Germans doubtless recall their own army of 1866, composed largely of reserves and inexperienced in all grades, since neither generals nor enlisted men had, as a rule, been under fire before.

This army, thanks to a sound course of training and education in time of peace, showed from the very first engagements a bravery superior to that of the Austrians, who had often been fighting since 1815. This fact is worthy of remembering. German writers are not therefore much impressed by the effects of modern armament, at least to the extent of believing a revolution necessary in methods of warfare. Good tactical instruction and the desire of conquering at all costs continues to be, in their eyes, the sure road to success. This success will be obtained by main strength on the field of battle, and only by attacking.

II.

If there is unanimity in Germany as to the absolute effectiveness of the frontal attack, discussion is, on the contrary, quite active as to the methods to be used. It is interesting, moreover, to find that all the arguments in vogue for the past

three years are to be found in the studies written immediately after the war of 1870. As in the Transvaal, the assailant had employed at the beginning of that campaign defective methods of attack, and had suffered considerable losses. The problem which presented itself, as it presents itself anew to those who have lost sight of it or who have never considered it, is as follows:

How can the assailant establish himself at effective range with superior forces in face of the fire of the defense, secure superiority of fire over the latter, and approach closer and closer, so as to be able finally to take the position with a rush?

This *effective range*, as has been said, has been increased from about 500 meters to 800 or 1,000. The *ensemble* of the problem is not changed. The uneasiness in certain quarters has been very great. The English methods of attack were similar to those used at Templehof, at Döberitz to some extent, and especially at the imperial maneuvers. This flurry was the result of a sensational article in the New York Herald last summer, reporting criticisms (denied later, however) by the English and American generals.

"The Americans as well as the English," it read, "have been unanimous in declaring that the tactics of the German infantry would be impracticable in a real engagement. In modern war the German infantry would be useless. It would serve simply as a magnificent target for the fire of the enemy."

Nevertheless some voices without much authority have been raised to demand a revision of the regulations. A great many wished them kept intact; others, such as Scherff, desired more restricted regulations. The more moderate—probably the wiser—without being always of the same opinion as to the wisdom of some of the changes to be introduced, demanded a slight modification to insure harmony between the value of the instrument and its mode of employment.

The high authorities seemed to range themselves along this line. A confidential order of May 6, 1902, called attention to the power of present armament, which can cause the first units engaged to extend their fronts; also to the extreme vulnerability of every close formation on open ground.

Without waiting for the publication, already announced, of a monograph by the Great General Staff on the "Fire deductions from extra-European wars," the official point of view

can be predicted. The range of ideas expressed for a year past in military literature permits the prediction.

This discussion will be resumed by taking for a starting point the lecture delivered by Lieutenant-Colonel Lindenau, chief of section of the Great General Staff, at Berlin, March 5, 1902.

The conclusions of this officer can be summed up as follows:

The obscure situation created by armament with rapid-fire guns and smokeless powder compels the first deployment to be "sparing and methodical." The first units engaged may extend their front, but only in such a way as to permit of reserving troops to give sufficient echelon in depth.

The front of the company can be extended to 130 meters, that of the battalion to 400 meters; but the fronts of the large units can not be increased proportionally—700 meters for the regiment, 1,500 meters for the brigade, are sufficient.

The front to be reconnoitered by means of patrols (scouts) crawling forward, under command of officers furnished with good field glasses.

Distribution of the skirmishers according to the terrain.

The opening of fire at about 1,000 or 800 meters. Seeking superiority of fire at that distance by increasing the fighting line to the necessary density.

The supports serve to maintain an intense fire from the firing line. No fixed rule as to reinforcements.

Very short rushes (30 or 40 meters) by small groups widely deployed, sent forward at varying intervals.

Arrange the regulations in accord with these principles, by having them prescribe the conditions of the advance by rushes and the conduct of the supports.

And Lindenau finished by the *Leitmotiv* of all the German variations in tactics:

"The offensive will maintain in the future its superiority and will still remain the best means of securing laurels."

The ideas expressed by Lindenau were undoubtedly shared by the recognized authorities. However that may be, they took the lead in the innovations attempted during the course of the past year. To be convinced of this it is only necessary to read in the pamphlet "The Attack of German Infantry" of 1902, the "criticisms" of some maneuvers at Döberitz.

Certain divisions at the imperial maneuvers are also seen maneuvering under the same forms as those which in the press have been called by the name of "Boer tactics;" but the enthusiasm for individuality at the beginning, for the advance of skirmishers and supports by small groups deployed, was not general.

Von Caemmerer protested at once against incorporating these expedients in the regulations. "The regulations are free enough to authorize them in case they are necessary," he says.

"The group of 8 or 10 men," says Major Hurt, "is not sufficiently organized. The company or the platoon are alone sufficiently officered to be led forward. As to the supports, they can be kept in hand for the purpose of having them always available. They must seek their safety in rapidity of movement—in utilizing up to the last the lines of communication rather than in the employment of widely extended formations."

"At one time after the war of 1870," wrote Von Scherff, "it was thought that in extreme deployment was to be found the sovereign remedy for the great sacrifices which we had paid for our success. To-day, in view of the checks received by the English after much smaller losses, the tendency is to look for the safety of the attack in the most complete individuality. The present propositions will doubtless be found as barren of results as were the experiments of 1872, and will disappear quite as quickly from the scene."

"The best means of sheltering one's self," said Von Stieler, "is not found in the terrain, nor in formations more or less complicated, but in the conduct of fire. The Boer tactics caused a loss of precious time with its fantasies. The troop is broken up into small fragments; these are still further divided; one is pushed forward, the other is held back; the voice of the chief is heard, these units are mixed up with each other, and the command is divided; the groups leave cover at a signal and throw themselves forward.

"All that is very pretty, but it is not war. The terrain and the point of view from which these formations are considered modify, however, all this question of vulnerability.

"In war only those units well in hand will be able to ad-

vance on the enemy. The way for them will be opened by the artillery."

An anonymous article from the *Militar Wochenblatt*, of October 18, 1902, is particularly interesting. After having loaded Lieutenant-Colonel Lindenau with praise, the writer takes serious exception to the conclusions of the lecturer. This article marks the variance of ideas.

"* * * The order of May 6 to the army," says he, "has increased the authorized fronts of the company and battalion in the firing line. This extension of the fronts ought not to lead to entering the engagement with thin lines, the fire-effect of which would be insufficient. The quintessence of infantry tactics is to give rapidly to the fire all the power possible at decisive ranges, or between the medium and short distances of 800 or 1,000 meters.

"The modern method of attack," adds the author, "is worth nothing in a great many cases, notably in the extensive actions engaged in by large units. It may be used against a position which the enemy defends passively, in cases where cover is entirely wanting. Between Metz and Strassburg the German army spreads over 150 kilometers of almost fifteen different routes. On each of them, therefore, almost an army corps will march, which will not be able to choose its ground.

"In the open plains, in front of an enemy firmly established, a decisive action will be avoided as much as possible, even with a superior artillery force, when the action will require the greatest sacrifices. This action could generally be undertaken by a neighboring force at less cost by taking advantage of more favorable ground.

"It will be the endeavor to engage rapidly at these points with forces superior to those of the enemy, to form thick lines of skirmishers, who will seek to strike the enemy in a hand-to-hand fight, and advantage will be taken of the superiority of fire to throw forward masses.

"This will be the best means, not to say the only one, of snatching victory. We defy the illusion that we can win without great losses."

Like Lindenau, the author of the above article rises above details. He treats of organizations, of attacks, and fighting fronts. The question is worthy of a moment's attention.

The practice of the maneuvers in which relative order reigns, and where numbers are not the same as in war, makes us familiar with extended fronts. The example of the English and the pretended powerlessness of frontal attacks tend to confirm these foolish practices.

The Germans have not assuredly escaped the danger, but their writers are reacting.

"The extraordinary extension of the English fighting fronts in the second part of the war," says Balk, "would not have been possible in Europe * * *. The bravery of the enemy is a great factor to be considered in extension of front. The depth must naturally be greater as the enemy is stronger.

"In the fight, we read in the *Jahrbucher*, the twenty and some thousand foot soldiers of an army corps crumble quickly; they suffer losses, and segregate themselves into parties covered by accidents of the terrain.

"In 1870 the mean front of an army corps was 2, 3, or 4 kilometers; it has become 5 kilometers against armies not so good as those of the Republic. Existing armies do not permit an extension of as much as 8 or 10 kilometers, as is often done. Intervals can undoubtedly be greater than formerly. Nevertheless *masses* are absolutely necessary, without which no attacks are successful."

From all the quotations just read, one clear idea is observed: The Germans consider that to conquer, *masses* are necessary.

Suitably extended at points of the ground favorable for their action, masses alone will make powerful lines of fire, and will so strengthen these lines, notwithstanding losses suffered, as to secure superiority over the fire of the defense, push forward the attack, make a breach, and take every advantage of any partial success obtained.

Between these zones of powerfully organized attacks, thinner lines can be thrown forward across the exposed zones, unfavorable for the attack and equally unavailable for the defense.

The large units thus attack in *line of masses*, at intervals more or less extended, according to the nature of the terrain, but such that the command can always make its action felt. This point being established, we will return to the discussion of the details of the attack.

At the commencement of 1903, in a work full of good sense, Boguslawski represented in its entirety the study of the practical lessons of the South African war and summed up in a precise manner the directing principles of the infantry fight. After having studied, like Lindenau, the principal battles of the Transvaal, he took particular care to avoid "premature generalizations." "Every change," said he, "must be based on a profound examination of war and its factors, and not on the outside appearance of one fact of war." For him, "the South African war has shown once more the difficulty of the attack on open ground. But this attack is not impossible if the troops and their fire are used judiciously.

"Experiments undertaken have only for their end the finding of the best detailed methods. They in no way modify tactics as a whole."

Here is how he considers these experiments:

Thin lines of skirmishers, he says, are praised, even when giving a dispersion of a group of 10 or 12 men over a front of 100 meters. Such formations are impossible; they would not be able to advance; their fire would be powerless.

It is pretended that the line could be progressively strengthened, that there would be time in the fight for it. This is all wrong. It is frequently necessary to obtain a quick decision. For example: The Saxons on the 18th of August, the second army at Sadowa.

Besides, the successive reenforcement of the line causes a mixing of units and an entire loss of command.

It becomes necessary to deploy at the beginning a sufficiently dense line of skirmishers (150 meters for a company, 400 meters for a battalion, are the maximum limits). They will suffer more losses, perhaps, but they will at the same time inflict more on the enemy. To make rushes at a run in actual war is impossible, where the knapsack is heavy and the men are fatigued. The strength of the groups, the length of the rushes, are things which it is impossible to fix beforehand.

As to replacing commands by gestures or signals, under pretext of not giving warning of the movement, it is absurd. A calm, strong voice will oftentimes have a very great influence on the conduct of the men.

As to the supports, it has not at all been demonstrated that in deploying them as skirmishers their losses are diminished. The fire of the enemy is directed uniformly on the entire firing line, in rear of it the ground is equally under fire.

This deployment of supports behind the firing line is, besides, very dangerous; at the very first opportunity they will open fire on the backs of their comrades. They must be kept in columns of companies; it has never been proved that this is impracticable.

For the assault, Boguslawski praises (the idea is not new) fire on the march, which, he says, gives as good results at short ranges as aimed fire at the longer ones.

The above work has given rise to new controversies. The ink flows in streams from the pen of v. der Boeck, of Caemmerer, and of Scherff. The dispute runs on, but it has become very much localized. It has reduced itself almost to the eternal question: Must it or must it not be a normal formation? Is it right or not to destroy the initiative of the subordinates?

The opposing sides, while irreconcilable on this point, as we have seen, are almost in accord on the general principles of infantry fighting. All recognize:

That decisive results in the fight can only be obtained by the fire of dense lines;

That on open ground this decision must be obtained at 1,000 or 800 meters;

That supports are necessary in rear to stop the gaps and maintain the intensity of the fire;

That the attack on open ground will always demand heavy losses, and decisive results will have to be sought as much as possible on more favorable terrain; but that this attack is not for that reason impracticable, and that it is imprudent to exaggerate its difficulties.

In what concerns the methods to be employed in the advance by rushes, as well as in regard to the formation of the supports, current ideas are very much at sea.

The rushes must be short enough, one side holds, to prevent the enemy from opening an effective fire. The attackers rise by small groups at a given signal; they dash forward 30 meters and fall down at the moment that the bullets begin to rain on them.

But officers of experience reply that this method would cause the men to rise and run forward twenty or thirty times in the decisive zone of fire. They have no reason for thinking so. Those who have made war know that the greatest trouble comes in getting troops from the least cover, and prevailing on them to move forward.

The question of throwing forward small isolated groups need no longer be considered.

It is not without interest to read what one of the German authors wrote on this subject a short time after the war of 1870, at a time when the recollections of the war were not deformed by time. The observation is of a psychological nature. The progress of armament leaves its value intact.

"They wish to prescribe an advance by successive rushes, executed platoon by platoon. But have the real circumstances presented by war been considered?"

"Can it be believed that platoons will rush forward in front of a line of riflemen who continue to fire on their flanks?"

"Can it be believed that men will march with assurance when they see themselves alone, and hear the bullets of their comrades whistling in their ears?"

What was thought impossible thirty years ago would now be demanded of men less inured to war.

On the subject of supports, the discussion extends from Boguslawski, who demands columns of companies, to the partisans of the new school, who have them deployed as skirmishers. The latter formation has been practiced at the Imperial Maneuvers, but it has retained its experimental character; it was, perhaps, even an act of courtesy for the invited Englishmen.

Listen again to the opinion of the author cited above:

"The support has not only for its object, the supplying of material losses experienced by the skirmish line, but also of strengthening the weakened morale of the men. . . . If it be supposed that isolated men reinforce the firing line throughout its extent, will it not be the men already engaged who will influence the morale of the new arrivals?"

They believed in the Transvaal, that they had discovered this truth, and saw in it a proof of the uselessness of supports.

In fact, to once more demonstrate that there is nothing new

under the sun, let us quote the following lines written twenty years ago by Prince Hohenlohe:

“After the experiences of the campaigns of 1870 and 1871 it was permissible to produce for a certain time on the field of maneuvers and to practically demonstrate new evolutions. Their authors were especially busy in solving the following problem: How is it possible to advance to the attack over a plain swept by the fire of the enemy?

“We saw the strangest formations reappear. The entire field of maneuvers, with a length and breadth of three hundred paces, was covered with files of two men, and consequently it was impossible not to see that they were elevating to the dignity of a system the general *sauf-qui-peut* policy.”

Would this not apply to the formations tried a year ago at Templehof, at Döberitz, in the Imperial Maneuvers?

In spite of the theorists who try to demonstrate that one can conquer without great sacrifices, the mass of the army share the opinion of Hohenlohe on these formations *en poussière*.

A German journalist, writing recently, says: “If there is really a Boer tactics it will not suit an army which attacks. Down with Boer tactics.”

This journalist might well have spoken the truth.

If we waive the question of opportunity for a normal formation, the extreme opinions are not so far apart, and entire agreement would undoubtedly be secured as to the method of advance of skirmishers and supports, as well as on other points, if the opposing sides were not kept busy in the domain of infantry technique.

But it is with difficulty that some have dared recall that artillery must open the way for the infantry. On the other hand, we have seen Lindenau calculate minutely the time necessary for an ambushed line of infantry to open an effective fire, for a company deployed to rise, run 30 meters, and lie down.

No writer shows the defender obliged, from what appears, to intrench to escape artillery fire, and for quite a time after each salvo to be in no condition to open an effective fire.

At the moment that the assailant shall see the projectiles of his artillery cover with iron and fire the enemy's line, will not the skirmish line be able as formerly—even better than formerly—to advance?

It is to be hoped that the rush will be as long as possible, for the start, as has been proved, will be very difficult.

Can its limits be set?

Does not its fixing correspond only to the conditions of peace when the combatant retains his morale intact, is always ready to instantly open a fire, which theory declares immediately "destructive?"

Will the movement of supports be then more difficult than formerly, when protected by the fire of skirmishers and the artillery? Is their formation very important on the point of vulnerability, and should not one above all things think of keeping them in hand and of their mobility?

Observations made during this unhappy Transvaal campaign are always opposed. But has anybody ever seen there any accord between the action of artillery and of infantry, the two arms of the attacker opposing their efforts to the single arm of the defender?

It is said to be only a moment when the infantry advance forces artillery to increase its range. This moment will be later in arriving than formerly, thanks to the greater precision of material. The distance of 500 meters fixed by artillery regulations, considered as excessive, can be easily reduced one-half.

Will the defender, less inured to war than formerly, more shaken by the terrible power of present weapons, be able to prevent the attacker from crossing this last zone, the so-called zone of death, but the zone of death also for the past 30 years and nevertheless crossed?

It is not ingenious formations, clockwork mechanisms, like those which have been tried, that are necessary, but a more complete union of arms and, as always, the desire to win.

In Germany these points of view have assuredly not escaped the higher authorities, who do not cease to encourage and facilitate by all means possible the working hand in hand of the different arms.

Official opinion, it seems, can be summed up as follows as to the employment of infantry in combat:

The march forward is in file as long as possible; it is reconnoitered by officer's patrols who, furnished with good field-glasses, slip to points favorable for observation.

When the patrols are stopped by something which they can not make out, some units are deployed "carefully and sparingly," over a wide front.

As soon as serious resistance is found, a powerful line of fire is established. Mixture of units is delayed as long as possible, by assigning to each one a small front—150 meters for the company, 400 meters for the battalion as a maximum.

This firing line is established first at the edge of the last cover, up to which they may have come by defiladed roads. Behind the firing line troops will be formed to serve as reserves, sufficiently numerous to give the greatest power to the forward movement.

In the more open zones, firing lines should be thinner, with supports in smaller bodies. On exposed ground the decisive struggle will commence at 1,000 or 800 meters. At this distance, with troops which are well trained in shooting, the attacker should begin to secure superiority of fire.

If the attack is pushed with sufficient force and the desire of winning, success is only a question of time.

Superiority of fire and the forward movement are only realized by a constant combination of infantry and artillery fire.

This can not be done unless masses follow the firing line to fill the gaps caused by the losses.

There can be no victory unless one is resigned beforehand to great losses.

In a word, the "new tactics" is simply regarded in Germany as *a new step forward in a path already old.*

NOTES ON THE ARTILLERY IN THE SOUTH AFRICAN WAR.^a

By P. VAN BERCHEM, Major of Artillery.

Translated from *Revue Militaire Suisse*, January and February, 1903, for the Second Division, General Staff, U. S. Army, by Capt. WILLIAM LASSITER, Artillery Corps.

In its number for July, 1902, the *Revue Militaire Suisse* has given an analysis of an article of the *Revue des Deux-Mondes*, entitled: *Some Teachings of the South African War*. While stating that the conditions under which this war was carried on are of too special a nature to permit positive solutions to be deduced, this article seeks to show that much instruction may be drawn from it; that the fire from rapid-fire guns using smokeless powder has forced the English to abandon their former methods, and that new tactics have been necessitated and improvised. This point of view has received, moreover, an immediate practical confirmation, inasmuch as we read, in the *Chroniques* of Germany, accounts of the new German infantry tactics inspired by that of the Boers.

^a Authorities consulted:

1. Capt. G. Gilbert, *Histoire de la Guerre, Sud Africaine*, Berger-Levrault, Paris, 1902.
2. *The Times History of the War in South Africa*, Vol. II, Sampson Low, Marston & Co., London.
3. *Naval Brigades in the South African War*, Sampson Low, Marston & Co., London.
4. Capt. Holmes Wilson in the United Service Magazine, 1901: *The War; The Future of Our Artillery; The Artillery in Natal, Colenso; The Artillery Duel; Essays on Artillery*.
5. *Notes on Artillery Fire*, by a regimental officer, in the United Service Magazine, 1901.
6. *Betrachtungen über den Krieg in Sud-Africa*, Beiheft zum Militär Wochenblatt, 1901, 8th Heft.
7. Roesler, *Material und Leistungen der Feldartillerie in Burenkrieg*, Jahrbücher für die deutsche Armée und Marine, April, 1900.
8. *Die Pompoms*, Neue Militärische Blätter, January, 1901, Berlin.

We seek, then, to draw from the South African war such teachings as it can give on the evolution of tactics consequent upon the improvement in firearms.

These teachings affect especially the infantry, in view of the leading rôle played by the infantry rifle in this war. But if the rather secondary rôle played by the artillery prevents us from drawing precise conclusions concerning that arm, the examination of certain facts concerning it, and some opinions which these facts have suggested, do not fail to claim a certain interest.

This examination is the object of the following pages. It does not, however, claim to be complete, for though the publications on the war are already numerous, the principal documents, such as the work prepared for the English general staff by Lieutenant-Colonel Henderson, and the Boer documents, whose publication General Botha proposes, have not yet appeared.

One must not, however, forget the very sensible difference existing between the rapid-fire artillery everywhere under test to-day, and the material employed in this war—a difference which will prevent us from making absolute forecasts concerning the future of artillery.

We will first take a rapid glance at the equipments of the two belligerents, and at their effective strength.

Then we will note the respective forces of artillery present in the principal battles. After having described the method of fighting generally employed by the two adversaries, we will permit two actual witnesses to give their special observations on the artillery: First, Captain Holmes Wilson, of the Royal Field Artillery, who took part in the fights on the Tugela; then, a German officer who fought on the side of the Boers in the Orange Free State. These two witnesses, while telling only of things seen, will not repeat one another too often. They did not belong to the same side, and they have figured on two portions of the theater of war whose terrains were not identical.

Finally, we will quote from Captain Gilbert, who, in his posthumous work, *La Guerre Sud-Africaine*, seeks to draw the lessons of the campaign. This work deserves to be read and meditated upon, and the extracts or résumés which we shall give are intended merely to invite our comrades to study

it. They will find there, among other things, a very interesting chapter of conclusions.

The author, enlarging upon his subject, branches out into a discussion of the rôle in war of the new artillery, and takes for that purpose the method adopted by General Langlois, commandant of the Twentieth French Corps, in his book of 1892: *Field Artillery in Cooperation with the Other Arms*. The principle, indeed, indicated by this title will be the one which he will strive to emphasize by the lessons of the campaign.

This article will not extend, then, into a discussion of the points of view expressed. It will limit itself to being objective, and to putting before its readers some facts and opinions furnishing matter for reflection.

I. MATÉRIEL.

Let us take a glance at the material employed on the two sides. We find on the part of the English:

The *field piece of 76.2 mm.* (3 in.) of 1884, improved in 1895 at the time of the introduction of smokeless powder. From the point of view of ballistics, we may consider it as closely analogous to the German piece of 88 mm., or the French piece of 80 mm., or even to our present Swiss piece. Only shrapnel were provided for use with it. These shrapnel contained 200 balls, and had combination fuses adjustable up to 3,650 meters. The piece fired from 1 to 2 shots per minute, with an initial velocity of 471 meters.

A recent arrangement of Colonel Clark has permitted the partial suppression of the recoil, and the transformation of the piece into one with accelerated fire capable of 5 shots per minute.

The *piece of the horse batteries* of the same caliber, very light; furnished with shrapnel, also very light, interchangeable with those of the field piece; this interchangeability did not exist for the charges.

The *mountain gun*, which fired a seven-pound shell, of little effectiveness.

The *field howitzer of 12.7 cm.* (5 in.), heavy for a field piece, provided with shrapnel and lyddite shell, with a maximum range of 4,900 yards.

The *siege pieces*, principally of 15.2 cm., but some of 12.5 cm. and of 10 cm.

The *navy pieces*, some fired from platforms, others from carriages improvised at the last moment for their transport. They were of calibers 15.2 cm., 12 cm., and 7.6 cm.

Finally, *some Maxim machine guns*, distributed by sections of two pieces each to brigades of infantry and cavalry, and to battalions of mounted infantry. At first these were machine guns using small-arm ammunition.

Later, when the English had seen the moral effect produced by the Boer pompoms of 37 mm., they too procured some of these machine guns of large caliber. They reached the army just before the surrender of Paardeburg.

The lyddite shell of the howitzer weighs 25 kg. (50 lbs.) and its explosive charge 4.5 kg. The cone of dispersion is 180° , which, with accurate fire, permits reaching behind cover; but the effect is inconsiderable against shields, due to the smallness of the fragments.

As for the number of guns in use by the English, this has varied with the different epochs, always increasing with the successive mobilizations caused by the first checks in Natal and on the Modder.

Here are the totals at different dates:

For the regular army:

October 7, 1899. Total on the line covering the mobilization, 66 guns.

December 10, 1899. Reenforcements of three divisions and one mountain battery have arrived—186 guns, of which 18 are howitzers and 20 machine guns.

January 1, 1900. A fifth division has arrived and a group of horse artillery—222 guns, of which 18 are howitzers and 29 machine guns.

March 1, 1900. Reenforcements: Sixth and seventh divisions, and four groups of horse artillery, of which one is of howitzers—338 guns, of which 36 are howitzers and 65 machine guns.

April 8, 1900. Reenforcements: Eighth division, 356 guns, of which 36 are howitzers and 81 machine guns.

In taking account of volunteers and colonials, the totals become 407 guns, of which 36 are howitzers and 144 machine guns.

It is proper to add the siege train, debarked between the 15th and 25th of December, and composed of 30 howitzers; then the detachments from the navy, whose total in guns is not given—the first three, at Ladysmith, on the Modder and the Tugela, comprised about 30 pieces.

Let us recall that the total effective strength dispatched to Africa amounted, on the 10th of April, 1900, to 200,000 soldiers and 4,000 sailors, and at the end of the campaign to 448,000 men.

On the side of the Boers artillery troops formed the only permanent nucleus, both in the Transvaal and the Orange Free State. The effective strength was about 800 men, with some reserves. Data concerning the matériel at their disposal has greatly varied. According to a report of the War Office of February 11 it was estimated at 220 or 230 guns, but there have been included in this estimate orders given and not filled, and, according to the *Revue Militaire des Armées Etrangères* (April, 1901), the matériel comprised only the following pieces:

Transvaal:

- 4 siege guns, 155 mm., Creuzot.
- 6 field guns, 75 mm., Creuzot, 1895.
- 8 field guns, 75 mm., Krupp, 1896.
- 4 howitzers, 12 cm., Krupp.
- 3 field guns, 75 mm., Maxim-Nordenfelt.
- 1 field gun, 75 mm., Skoda.
- 8 machine guns, 37 mm., Maxim-Nordenfelt.
- 13 machine guns using infantry ammunition.

Orange Free State:

- 14 field guns, 75 mm., Krupp, 1892.
- 6 field guns, Armstrong, muzzle-loading.
- 3 mountain guns, Armstrong.
- 1 machine gun, 37 mm., Krupp.
- 3 machine guns using infantry ammunition.

If these figures are correct, we have, then, 8 pieces of large caliber, 38 field pieces, 3 mountain, 9 pompoms, and 16 machine guns using infantry ammunition.

The Krupp piece was analogous to the present German material, with accelerated fire. That of Creuzot approached the French rapid-fire gun without having its accuracy and not possessing its shields. Both, without being entirely up to date, were superior to the English pieces in range and rapidity of fire. The Krupp material, while inferior to that

of Creuzot from the point of view of ballistics, seems to have been preferred by the Boers on account of the superior quality of its ammunition. The field pieces had both shell and shrapnel. The Maxim-Nordenfelt could throw 50 to 60 shell, of from 1 to 2 pounds each, per minute, and carried shields. A part of the ammunition had fixed metallic cases. The Boers, like the English, used smokeless powder.

The effective strength of the army at the beginning of the campaign has been estimated at 50,000 men; but in taking account of all the men who left the commandos to return home the present effective never passed 36,000 to 38,000 men. This would be, then, the strength of an army corps, with a proportion of artillery half that of an army corps of the great countries of Europe, and spread, moreover, over this vast theater of war.

II. STRENGTH OF ARTILLERY IN THE VARIOUS BATTLES.

In referring to the historical works on the war for the complete description of the rôle played by the artillery in the principal fights, it is worth the trouble to go over the lists of each and note the number of guns which are found available on either side. If this is easy with respect to the English, the same information concerning their adversaries is not at all precise or reliable, nor do the reports always agree.

The army of Joubert on entering Natal comprised 16 field pieces, besides some pieces of varied type, among which the celebrated Long Tom figured. Sir G. White opposed him with 6 field batteries, 1 mountain battery, and 1 colonial battery from Natal, in all 48 pieces. Note the following details: At the first encounter of Glencoe, October 20, the Boers, after having surprised the English camp by a fire of artillery, abandoned Talana Hill before the English attack. They had only 4 guns and 2 Maxims against 18 English pieces. The next day, October 21, at Elandslaagte, we find 2 pieces pitted against the Natal battery at first, and then against 12 additional field pieces. At the affair of Rietfontein, October 24, the only Boer piece which opened fire against the English column in march withdrew afterward before 12 pieces. Impressed from the first encounter with the fact that the range of the Boer artillery surpassed that of the English artillery, General White telegraphed at once for navy guns.

The first detachment of these arrived at Ladysmith October 30, just in time to take part in the battle which preceded the investment of the place. On this day Joubert probably put in action all the artillery he possessed against the 7 English batteries. The latter energetically defended the retreat, supported by the 3 navy guns, which debarked from the train to open fire. One of these was overturned by a projectile from Long Tom; but the others, thanks to the effect of their lyddite shells, a novelty for their adversaries, did not fail to gain the advantage. On the same day the mountain battery, as well as the detachment of Nicholson's Nek, fell into the hands of commandos unprovided with artillery.

The army of Cronje, on the Mōdder, had 10 guns. Lord Methuen while attacking him had his army successively reinforced.

In the fight of the advanced line at Belmont, November 23, the 2 Krupp pieces and the pompoms of Major Albrecht which, the evening before, had retired behind kopjes before an English reconnoissance, did not take part in the struggle. On the part of the attack there were 2 batteries and 4 navy 12-pounders. On the 25th, at Graspan, 6 Krupp pieces, 1 Nordenfelt, and 1 Maxim supported the contest for 3 hours against the same 16 English pieces.

On the 28th, at Modder River, Major Albrecht had disposed 5 pieces in the center, 2 on the right wing, 2 on the left, with a Maxim, and had them all sheltered behind strong epaulements. He had, besides, a Hotchkiss, intended to be posted according to the course of the fight. Lord Methuen, reinforced by a battery, had 22 pieces.

When a little later he sought, on the 11th of December, to force the last point of support of Cronje at Magersfontein, he had 3 field batteries, 1 horse battery, 1 battery of howitzers, and 5 navy guns, of which one was of 15-cm. caliber. In this battle, commenced at night by the attack of the Scotch brigade under General Wauchope, the Boer artillery, apart from the pompoms, did not make itself heard until 4 o'clock in the afternoon. At this moment the sudden opening of its fire determined the retreat of the Scotch, who had remained in place after their check of the morning.

The Boer artillery seems to have played an even slighter rôle in Orange than in Natal. We have proof that General

Cronje had very little artillery; for after having left 1 piece at Magersfontein, at the time of his retreat on Paardeberg, he gave up, on his surrender, only 4 Krupp field pieces and 2 pompoms. He had, then, no heavy calibers and scarcely could he use his 4 guns when he found himself exposed in his camp at Paardeberg to the fire of more than 50 pieces, among which were field howitzers and navy guns.

Of their 4 heavy 15-cm. pieces, the Boers had 1 before Mafeking, 1 before Kimberly, and 2 before Ladysmith. If we add a few pieces before these two places, and a few others with the troops in the south of Orange, we arrive at about the total effective strength indicated above.

In the second phase of the campaign in Natal, General Joubert distributed his artillery between the defense of the Tugela and the siege of Ladysmith. A map of the siege, in *Naval Brigades in the South African War*, indicates before this place 10 emplacements for siege pieces, besides 5 for field pieces. This figure must be a maximum which has scarcely been reached at any one time.

General White had received, as we have seen, some navy guns to reinforce his seven batteries. There were two 15-cm. pieces mounted on wooden platforms; four 12-pounders, of which three were mounted on Scott improvised carriages, the other being a landing gun; finally, 4 Maxims, of which three were on carriages and one on a tripod. It must be remarked, however, that this superiority was only relative, in view of the limited ammunition supply which forced the besieged to a great economy, especially toward the end of the investment. The two 15-cm., for example, had only 300 rounds each.

In the combats on the Tugela we find at the beginning, at Colenso, December 15, 5 field batteries and 12 pieces of heavy caliber (2 of 15 cm. and the others 12-pounders) against 9 Boer pieces (5 only, according to Gilbert) and some pom-poms. Afterwards, at Venters Spruit and Spionkop at the end of January, at Vaal Krantz and Pieter's Hill in February, the English artillery was further increased. The Boers, to counterbalance their inferiority, detached, on occasion, pieces from the siege of Ladysmith. Thus at Vaal Krantz we see a Long Tom playing an important part. They also called Major Albrecht from the Modder to Natal with half of his artillery. This remarkable utilization of interior lines is

established by a letter of Major Albrecht's.^a This assistance was only temporary. Thus the disproportion of forces went on increasing, and when the English forced the Tugela at the moment when the Boers commenced the retreat and the raising of the siege of Ladysmith—both occasioned by the surrender of Cronje at Paardeberg—we see the attack on Hilongwane Hill prepared by the fire of 64 pieces against only 3.

III. METHODS OF COMBAT OF THE BELLIGERENTS.

In order the better to understand the manner in which the material was utilized, it is useful to bear in mind the nature of the organization to which it pertained. Here is the description of the method of action of the Boers, given by Captain Gilbert and condensed in a few words:

“After having taken the initiative and the strategic offensive in their invasion of Natal, they limited themselves to a purely passive tactical defensive.

“Their disposition for battle was always linear, without organization in depth—save sometimes an advance line—and without reserves. So, to reenforce a point or extend the line, they had no other resource than to withdraw men from the part of the line least menaced—a proceeding rendered possible by the mobility of the troops, which were always mounted. Their victories were always sterile, because they contented themselves with parrying without thrusting, because they did not know how to pursue a beaten enemy. These tactics, which check the enemy but do not crush him, were almost imposed upon them by the lack of organization (they know only the commando), by the lack of discipline, by the very slender effective strength, finally, with which they opposed the English.”

A letter from a companion of Villebois-Mareuil in the *Journal des Debats* attributes a great part of the offensive weakness of the Boers to the election of officers by their men, a principle which must have often paralyzed the initiative of the chiefs: “It is well enough as long as the electors and the elected are in a communion of ideas, but when the elected thinks to execute a plan which is not agreeable to those under its jurisdiction, it approaches the precipice of being cast aside and replaced by a member of the majority.”

^a See *Journal de Genere*, February 11, 1900.

The Boers, convinced by experience, renounced later this system, and decreed, September 14, 1900, a true military organization, in which the generals and commandants were named by the commander in chief, the field cornets by the commandants, the corporals by the field cornets. But this organization was only able to figure in the guerrilla warfare, with which we shall not occupy ourselves here.

The German officer, to whose testimony we shall recur later, characterizes thus the Boer method of fighting: "They had in general for a principle to seek to envelop the adversary, or at least to avoid being themselves enveloped; that led them to a considerable extension, and consequently to a very weak occupation of their own lines. The envelopment of the adversary is advantageous, for this mode of fighting favors better than any other the effect of one's own fire by concentrating it, and neutralizes at the same time the enemy's fire by forcing it to be scattered. Often they have committed the fault of not utilizing the results obtained and pushing forward while continuing the fire; but it would be an error to impute their passivity to extended formations alone. Good commandos, led by energetic chiefs, have often proved the contrary."

We will understand, then, without difficulty that with their small number of pieces, their lack of organization, and their very extended fronts, the Boers have employed their artillery only by isolated pieces. These general conditions have prevented them from realizing the unity of action desirable between artillery and infantry.

On the part of the English, without being a party to the same parceling of forces, we find that the superior unit of artillery does not exceed the group of three batteries attached to each division of eight battalions. There is lacking, then, a fixed organization of command for the direction of the fire of great masses. Captain Gilbert thus describes the English method: "To start with, their plan of engagement is purely linear like that of the defense. No reconnoissances, no advance guard action; and in place of utilizing the passivity of the enemy for a turning attack or distributing their troops with a view to carrying some decisive point, they deploy prematurely their forces before the whole front. It is scarcely in such a method of conducting battle that one will find teachings for artillery."

IV. OBSERVATIONS OF CAPT. HOLMES WILSON.

One of the first facts which struck Captain Holmes Wilson, as well as the whole English army, from the time of the first encounters in Natal, was the superiority of the Boer artillery material over the English material. If this superiority has not played a more important rôle it may be attributed to the small number of cases in which the Boers could act by concentration of fire upon a single point for a definite time, to the defective quality of their ammunition, and finally to the too restricted number of their pieces.

This superiority has first of all affirmed itself by a greater range. The English field artillery found itself exposed more than once without being able to reply, not only to the fire of pieces of heavy caliber, but even to that of simple fieldpieces. Examples do not lack. At Spionkop the deficiency of range prevented 40 English pieces from supporting by their fire a decimated infantry. Likewise at the demonstration of the 24th of January before Breakfontein, immediately before the attack on Vaal Krantz, 6 field batteries suffered in the open the fire of an enemy out of reach. Two days later, when the Long Tom appeared at Dornkloof, the inconvenience of the deficiency of range becomes still more sensible; here it is the field howitzers of 12.7 cm. which are not able to reply. The Long Tom was posted on a high hill and completely under cover; it was especially necessary to resort to the curved trajectories of these pieces to have a chance of hitting him. Mounted on a disappearing carriage the duration of his appearance when he fired was very short; the projectiles of the heavy navy pieces whose range was alone sufficient, owing to the great time of flight for the distance, always arrived after his disappearance, and, with their angle of fall, struck the parapet or passed over without ever being able to reach behind the shelter.

The case of the battle of Mooi River is still more characteristic on account of the moral effect produced. There, the Boers utilized the great range of their artillery to surprise their adversary, as they had already done at Glencoe. After the investment of Ladysmith they had pushed a strong reconnaissance to the south of the Tugela; one of their detachments, with one or two pieces, surprised at Mooi River the

camp of all arms of General Barton, and at 4,500 yards threw shells into his tents, somewhat as the Prussians did at Beaumont in 1870. An English officer present at this affair, after having described the very uncomfortable effect which this surprise had upon those who suffered it, adds: "Then our battery dashed at a gallop out of camp, and we said to ourselves: 'Now the Boers are going to see that they have gotten themselves into a wasp nest,' and we waited impatiently for what was going to happen. The battery opened its fire; that of the enemy was turned against it. No great harm was done the battery; but what was our surprise to see our 6 pieces obliged to stop firing because they were outclassed in range. As the ground, all cut up in ravines, rose rapidly beyond, they could not advance. Can one be astonished that our beautiful confidence was somewhat shattered after having seen 500 of the enemy bombard with impunity a camp of 3,000 men at midday?"

Two objections may be made against the fire at long distances. The first is this: The entirely exceptional transparency of the air in South Africa which favored long-distance firing will not be found elsewhere. This is evident for England. However, there are other countries where the conditions of visibility will also be very favorable: Egypt, the East, Greece, where in the last campaign fire was delivered at 7,000 meters, while observing perfectly the shots. The second is more serious: The remaining velocity of the shrapnel balls at great distances is insufficient to produce the necessary effect. This objection is supported by facts observed in the war. Thus apropos of the 6 batteries which we have just seen exposed to the enemy's fire before Breakfontein, Capt. Holmes Wilson relates how, after having fired 2 hours without reply, they were suddenly subjected to a fire of artillery.

"When they saw projectiles bursting over them without being able to reply, the troops were seized with dismay, asking themselves if they were going to take part in a repetition of the Colenso disaster; but when the smoke had blown away, it was found that there were no casualties. Long range shrapnel fire of fieldpieces had just shown itself entirely inefficacious."

The superiority of the Boer material has further shown

itself by its greater rapidity of fire. Our witness has seen at Breakfontein 3 Boer pieces hurl at 6 English batteries more projectiles than 6 English pieces could have thrown with their most rapid fire. He adds; that the same day the slowness of the English fire permitted a Boer piece to be withdrawn and a pom pom to be advanced without being disturbed. These are brief opportunities; they often present themselves, and it is necessary to be able to take advantage of them. The author believes, then, for such cases, in the great superiority of a battery of 4 rapid-fire pieces over the English battery of 6 pieces.

Let us pass now to the utilization of shelters and of natural cover. The Boers made such a skillful and constant use of this factor that we may attribute to it a rôle of the first order in the campaign. The long halt of the army of Sir R. Buller on the Tugela, is it not principally due to the art displayed by the adversary in remaining completely invisible?

The check to the attack of Lord Methuen at Magersfontein, is it not due to the same cause? On the other hand, is it not because they did not know how to employ this factor that the English were driven from Spionkop, and that they saw the war prolonged for so long a time? The author does not hesitate to find in this the secret which permitted an adversary, incapable of resisting a month in the open, to keep the field for years; and, especially, which permitted his artillery, so inferior in numbers, to keep from being annihilated. The disposition of his artillery by isolated pieces, so open to criticism from many points of view, has had this advantage, to permit of their being concealed very much better.

So one of the principal tasks of the English artillery has been to discover the emplacements of the enemy's guns. It was not rare to see the other arms come to its assistance for this purpose. If one wishes to determine the different places from which at variable intervals bluish flashes are going to appear—which one can not foretell in advance—it is necessary that a large portion of the terrain be constantly watched, and for that one pair of eyes is not sufficient; a very great number are needed.

Seeking cover, everywhere and always, has been the first principle of tactics of the Boers. Two circumstances have

permitted its excellent application—long-range guns and, especially, absence of smoke. What are we to think of the value of this principle? If it is dangerous to be always having recourse to it, it is evident that wherever it can be applied it will prolong the duration of the struggle. Up to that time the English artillery, exercising and maneuvering always in the open, had neglected it, but it was not forgotten elsewhere. Thus the German Regulations say: "It is always desirable to protect oneself against the enemy's fire by throwing up works as soon as there is time, even in an offensive action." And again: "Any kind of work is good if it serves to render more difficult the enemy's observation."

So the author asks what would happen to the English artillery if it found itself opposed to a Prussian artillery having recourse to cover, unless it intends to do likewise.

At Colenso all the Boer guns were sheltered and most of them invisible. At Spionkop not a single one could be distinguished. At Vaal Krantz, as we have seen, the only one which was perceived, the Long Tom, was so well protected that nothing could be done against it. At Pieter's Hill, all were under cover and invisible. Formerly it was thought that the first gage of success was to accomplish the regulation of fire first. This first gage to-day might well be the taking shelter. If artillery, in taking a position to the front, falls under the fire of invisible batteries, which of the two sides will have the upper hand? The answer does not appear to be in doubt. So the author concludes from this that a delay in opening fire, in order to gain the necessary time to prepare shelter, will be almost always advantageous.

Another question: What is the effect of artillery on shelters and on the troops behind shelters? On the Tugela, where the Boers constructed many works, the effect of fire of field pieces, like that of the heavy calibers, field howitzers, or 15 cm. navy guns, was nil. One might readily foresee very slender results after experience on the practice ground; but this appears to have been a revelation for the English artillery, who, according to the author, had never previously practiced firing at targets under cover.

How is it that this effect has been nearly nil in reality? For the works, the damages were rapidly repaired at night; as for the men, under the fire of artillery, they remained

hidden. As soon as the infantry of the attack approached and the bombardment slackened, they lined the trenches and decimated their adversary. To the question, "What will artillery do if its fire is so ineffective against shelters?" the author answers, "The occasions for using shrapnel will be much more rare; we must turn to the study of another projectile and have recourse to heavy calibers."

We will see Captain Gilbert treating this question in a more general manner and giving to it another answer, which he considers one of the principal lessons of the war. So we shall take up this point at greater length at the end of this article.

With regard to mobility, Capt. Holmes Wilson states that the navy guns and the field howitzers have shown themselves sufficiently endowed with this quality, even in a country devoid of roads. He sets forth the importance of this factor for heavy artillery which must follow the army. And is it not heavy artillery which, in a terrain like that of the Tugela, has been obliged to open the combat? However paradoxical it may appear, heavy artillery then must be able to open fire first and cover the advance of the other arms. With a field artillery provided only with shrapnel and not able to fire at great distances, the commander of an army will not be able to attempt the least attack before the arrival of his heavy artillery. In this regard he remarks that we will return to the idea, abandoned in 1870, of keeping some artillery in reserve. For what good will it do to push guns to the front at the beginning of an action, only to expose them to a fire to which they can not reply, as happened on the Tugela? If heavy pieces are mobile enough to open the fight, must not field artillery be reserved until its fire can be utilized in concentrating it on the decisive point of attack. We will find again this return to the idea of reserve artillery in the conclusions of Captain Gilbert, but in a much larger sense indeed. In any case the frequent employment of heavy pieces in Africa opens new horizons.

Our observer takes up also the much discussed question of the artillery duel. The theorists, he says, have attributed to it a predominant and decisive rôle in the fight. It is on the favorable issue of this duel that they make depend the possibility of passing to the attack or the counter attack of infantry. From it they expect the success of the day. They have for-

gotten one very simple fact, however: Even if one of the parties desires to engage in this duel, the adversary, if he does not wish to, will be able often, thanks to smokeless powder and long ranges, to refuse it. The artillery duel has never had decisive results in the South African war because it has never really taken place. "The Boer artillery was too much outnumbered to accept it, and, thanks to its skill in finding cover, favored by smokeless powder, it often succeeded in maintaining itself. Its pieces were rarely silenced. When any of them were discovered and came under fire, they were moved and reentered the fight behind some other emplacement prepared in advance. This was the game played at Colenso, Spionkop, Breakfontein, and Vaal Krantz."^a

In the battles of the future, if the artillery knows how to mask itself, it will not be seen. Upon what will that of the attack fire? It might, utilizing cover like the defense, seek to destroy the guns of the defense one by one as it perceived them. To avoid this successive destruction, the defense might find itself obliged to open fire all along the line and reveal its position. However, on the Tugela the bombardments of the reconnoitering force never provoked a reply; they fired at hazard because they saw nothing. It would be premature to say that the artillery duel is dead, but it will not survive in the form in which, until now, we have generally pictured it.

If in this particular case we are able to declare a change in the tactics of artillery, on the other hand we may affirm that nothing has transpired to invalidate the principle of concentration of fire. This principle, from which Napoleon drew remarkable results at Friedland by the aid of his massed batteries, has remained always fruitful since then. The Germans made constant use of it in 1870. If the experience in Africa has proved the justness of the principle, it has shown the impossibility which one may often have of applying it. It is advantageous whenever one has a target visible and of some importance. Targets of this character the English expected on arrival in Africa. But how concentrate one's fire when one sees nothing? It had not been foreseen that the invisi-

^aThe difference of opinion on this point which we will see later on expressed by the German observer, seems assignable to the feeble resistance of the Boer artillery in the more open terrain of Orange.

bility of the enemy would often render the application of this principle impossible for the artillery. This was the case at Colenso, at Spion Kop, and Vaal Krantz. However, if at Spion Kop the massed English artillery could not act, the Boer pieces, although scattered, knew enough to concentrate their fire upon the plateau so dearly disputed, and realized all that one could expect from this fruitful principle.

V. OBSERVATIONS OF A GERMAN OFFICER IN THE SERVICE OF THE BOERS.

The service of the piece by the Boers was skillful and rapid, the reconnoissance of the target easy, estimation of distance, as well as observation of fire, correct, but the courage to resist to the last man was lacking. In spite of discipline superior to that of the commandos, fire was stopped and they put themselves under cover when losses commenced. The actions began generally with an artillery duel. Due to the great numerical superiority of the English, it was terminated most often by the silence of the Boer artillery. The latter would not appear again, although that would often have been easy. The English artillery fire was then turned on the Boer riflemen in order to sustain the infantry attack. Cases occurred, however, of a small number of Boer pieces being able to maintain their position, which shows the difficulty of extinguishing the fire of a hostile artillery even very inferior in numbers when it is well placed. The battle of Dewettsdorp gives us an example of this kind. Three Krupp pieces of 7.5 cm. and a Maxim-Nordenfelt, placed at intervals of 50 to 200 paces, protected behind rocks, sustained the struggle for half a day against 18 English guns at 2,600 to 3,000 meters, the latter in the open and plainly visible. Many of these were momentarily put out of action. The arrival of 12 additional guns then quickly terminated the struggle. The Maxim-Nordenfelt alone remained still for a time under a formidable fire, thanks to its shield; but as it happened, on changing position to place itself more in the open, it was also obliged to abandon the game. A half only of those who had been at this piece were hit. The shield was covered with the marks of shrapnel balls. This resistance of a small number of pieces was facilitated by the defects of the English fire. The latter opened fire without knowing thoroughly where the

target was and distributed it over a great surface. To a few shots well regulated succeeded a great number too short or much too long, and that even in cases when the Boer artillery was not well masked. This poor fire action must arise from one of the following causes: Absence of exact determination of the emplacement of the target, poor observation, poor action of the fuses, or defective service. Perhaps field glasses of insufficient power may have counted for something. The importance of the quality of the latter has been especially emphasized.

How did the English shrapnel behave? A part of its balls remained in the envelope after the burst. The angle of dispersion of the sheaf was so small that the width of the dangerous space did not exceed 4 to 5 meters. Under these conditions the number of hits on lines of skirmishers, not very dense, could not be very great. The dangerous space scarcely extended much more in depth; at 80 meters from the point of burst, wounds were rarely serious.

"The Maxim-Nordenfelts made a remarkable showing; even beyond 3,000 meters some of them sustained the struggle against 3, 4, and even 6 field pieces. At the battle of Bosh-rand I myself fought with one of these pieces—well covered, it is true—during a whole day against 4 English pieces. Some of the latter were indeed reduced temporarily to silence, without our having suffered the least damage. Against cavalry they showed themselves superior to every other piece. At Thabaucheu two regiments of lancers were thrown in confusion in a very short time by 2 Maxim-Nordenfelts. The uninterrupted series of points of burst on the ground permits readily following up a rapidly moving target; which can not be done by a field piece using shrapnel and a much less rapid fire. I have gained the impression that the Maxim-Nordenfelt is a formidable weapon."

This opinion is, however, strongly controverted. I refer readers who may be interested to an article in the *Militärische Blätter*. It recites some opinions favorable to this arm, and others, more numerous, of an unfavorable nature.

Whatever may be the value of this arm, it has interested our observer from another point of view, that of its steel shields. This was the only piece which was furnished with them. He considers their advantage so great that he desires

their introduction in Germany. They afforded good protection against shrapnel and musket balls, and permitted a better and more tranquil service. The shield has two inconveniences: It increases the weight by 50 to 60 kg.; it renders the position more visible. The author does not hesitate to consider these disadvantages inferior to the advantages which it assures. Moreover, by choosing a suitable color for the shields their visibility will be greatly diminished.

The English had no shields. Capt. Holmes Wilson has not expressed an opinion concerning them. He limits himself to a questioning and rather doubtful attitude. He cites an English captain who carried sacks with him and filled them with sand at the moment of taking a position, to afford a protection in front of his pieces.

After these observations on the materiel, let us turn to those of our observer on its employment. In estimating the effect of the English fire he has been struck with its great superiority when it was concentrated and not simply frontal. The advantage of obtaining cross fire is so great that one must neglect nothing to secure the benefits of it. It may be attained much better by disposing the artillery in groups well spaced, rather than massing it in a single place, from which it can only fire in one direction. We need not renounce the advantage of this disposition permitting concentration of fire, even if it is prejudicial to unity of direction.

Here is an example: In the battle of Donkeshock an English brigade with some batteries deployed on a plateau 4,000 meters wide by 6,000 meters deep, about 3,000 to 3,500 meters from the Boers, who had placed 7 pieces on one front. Success seemed to be favoring the attack; but the aspect changed when 4 Boer pieces took a position on the flank. The lines of English skirmishers and their reserves began to waver under the cross fire, and their forward movement was suspended. The artillery was obliged to move to the rear, soon followed by the infantry, which executed the movement while suffering sensible losses. A counter attack at this moment would have had great success. The fight took place at such ranges that the infantry rifle did not play a great part; the scene shifted as soon as the artillery commenced to act in two groups with cross fire. If it is often possible to advance while protecting ourselves from one direction, it is rare that

one can do so protected from two directions at the same time; this is why a cross fire is so efficacious.

Against lines of skirmishers protected by works the English often employed the lyddite shells from their navy guns or field howitzers. These shells all had percussion fuses. To obtain a favorable effect it was necessary to maintain an accurate fire and to spend, besides, a large quantity of ammunition on a single point. We have already seen how little the English realized these conditions, which explains the small effect produced by this kind of fire. Moreover, even on bursting near by, these projectiles did not always do harm. The author saw men whose clothing was ignited by lyddite come out of the affair with light skin burns. He saw one single shell produce a frightful effect by bursting in the midst of a crowded group of horses and their drivers.

The English guns did less harm to the Boer infantry than to the artillery, because the cannoneers of the latter could take shelter less well individually. At the sight of each hostile gun fire the men stooped down, only to rise again for each lull. "It is certain that our losses would have been more considerable if we had seen less well the hostile gun fires, because we would have been less able to avoid them." This observation is interesting; it shows how the use of cover gives, besides the advantage of diminishing our own losses, that of increasing the loss of the adversary by preventing him from sheltering himself at each gun fire.

We can not follow the author in his interesting observations on the tactics of infantry; that would be going beyond the limits of this article. We shall limit ourselves to citing certain remarks relating to common action of the two sister arms.

"It may happen to the infantry to be obliged to attack under a fire of infantry and artillery, without being itself supported by its own artillery, and of being able readily to carry off the victory. But for that purpose it must fire and take cover from the beginning; this is the indispensable rule for both arms, especially the infantry, and before which the necessary time and space for its application become factors of an entirely secondary importance."

"However efficacious shrapnel may be against objects in

the open, all that it can do against objects under cover is to prevent them from showing themselves in order to fire, and thus facilitate the advance of the infantry. It ought to sustain the latter up to within a very short distance of the enemy, for the last approach of 100 meters may still suffice for a defender even very inferior in numbers, but remaining intact, to decimate the attack by the fire of its rifles. To cover this last distance, the infantry will have to count only on itself.

"This was not the English proceeding; in the infantry attack, the artillery ceased its fire much too quickly. On the contrary, when the Boers pushed forward, their artillery supported them by fire, even up to 150 meters of the enemy. The shrapnel burst over our heads without touching us. I believe that we would have preferred even to receive some wounds from that source rather than do without their support."

"One learns readily enough to find shelter in the terrain from small-arm fire, but with much greater difficulty from shrapnel fire. I remain convinced that a frontal attack in the open is as impossible against artillery as it is against infantry. Even at great distances, an advance of a few hundred meters under shrapnel fire suffices to decimate an organization or force it to retire. Here is the method the Boer infantry followed when it advanced under artillery fire: As soon as a projectile burst at a fair distance in front of a group, the latter ran immediately to the front to get out of the dangerous zone."

These are, finally, the conclusions of the author:

"For the future battles of a European war, the South African war gives no definite lessons. The numbers on one side, the matériel and its utilization on the other were insufficient. Since, in many cases, the English, with a triple or quadruple superiority, have had great difficulty in silencing the hostile artillery, we may deduce that in the case of two artilleries of nearly equal strength, one will have much difficulty in gaining a complete ascendancy over the other."

The true lesson of the campaign for artillery is the following: It must support the attack of the infantry by its fire, but it must not advance in the open under the enemy's fire.

VI. OBSERVATIONS OF CAPTAIN GILBERT.

In his conclusions, Captain Gilbert begins by pointing out the danger of premature generalizations. In basing conclusions on certain facts of this war, we risk committing great errors. It is easy to produce examples of this. In a discussion in the French Senate on the abandonment of certain fortresses, the conclusion has been ventured, based on the resistance of Ladysmith, Mafeking, and Kimberly, of the failure of the most modern artillery against entrenched camps of a certain importance. Yet, against these three fortified places, of which two had perimeters of 20 kilometers, the attack utilized for heavy calibers only four pieces of 15 centimeters. Can one properly condemn a matériel when the task imposed upon it is entirely disproportionate to its effective strength?

Another example, which we must reproduce textually: "After the checks on the Tugela and the Modder there were writers who condemned absolutely all frontal attacks, proclaiming as invincible the defensive sustained by skillful riflemen, and concluding that, though leading to no decision, the defensive was in future the only tactics possible.

"The English, in spite of their enormous numerical superiority, had seen their assaults pushed back. This was enough to pronounce a judgment without appeal; the inquiry was not even made if the assaults were delivered in accordance with proper methods.

"And as the English artillery in particular was ten times stronger than that of the federals, as it had done all the firing in the beginning, had continued to do so, and lavished tons of ammunition without obtaining appreciable results, people were led to declare the futility of that great offensive agent, the gun and its shrapnel. They considered as henceforth inefficacious the preparation of the attack by guns, which amounts almost to denying all chances of success to the attack.

"The truth is that the English artillery, well served, well horsed, excellently maneuvered, was employed according to the most detestable methods. Results were expected from it which it has never given, and hence its failure should not surprise us.

"They caressed at first that chimera of reconnoissance by

artillery fire, which was hatched across the Rhine, but of which our neighbors have promptly disabused themselves.

"In the plans of engagements of Sir R. Buller and Lord Methuen, we have already pointed out the complete absence of advance-guard action. The hostile position was before them with all its mysteries. They searched it with their shells, hoping to get some maladroit reply which would have disclosed the dispositions of the defender. The latter, better advised, remained quietly under cover, and the powder was burned in pure waste.

"None the less they passed on to the bombardment of these undetermined positions. The artillery duel being suppressed, and for cause, they proceeded to the preparation of the final attack. But what was their idea of this preparation, and the relation of these two phases? For 24 hours at Vaal Krantz; for 36 hours at Magersfontein, they hurled against a line of kopjes the fire of 50 or 100 guns; they emptied their caissons. Then silence fell over the whole line; the artillery ceased its fire, and infantry, cavalry, artillery threw themselves forward offensively. There was complete disjunction between these two acts, the preparation and the assault; sometimes there was even quite a delay between the two.

"During the storm of this pseudo-preparation the Boers kept themselves in their trenches; they did not have to raise their heads above their sand bags to watch over and fire upon a terrain on which the enemy had not arrived. The cannonade having ended, at the moment when the English columns, much too dense, appeared offensively, the defenders lined the parapets and fired on them as at target practice. Up to that time they had had but insignificant losses.

"It is, as a matter of fact, an elementary notion that field artillery acts only against unmasked objects. To oblige the defender to unmask himself, the infantry must threaten him from the outset. The artillery combines its *rafales* with the rushes of the infantry; it must, as General Langlois^a has fully shown, continue its fire over their heads up to within 300 meters of the objective. That is the cooperation of the three arms; it is the fruitful law which alone enables the

^a L'Artillerie de Campagne en liaison avec les autres armes, by Colonel Langlois, Librairie Baudoin, Paris, 1892.

offensive gradually to lower the mask of the defender in order to strike him in the face.

“This law was disregarded by the English, as it was by the Russians at Plevna. In both cases the isolated cannonade remained sterile. Must we deduce from this the inefficiency of artillery?”

On reading these lines we can not avoid recurring to the description the author has given beforehand of the battle of Colenso. It deserves to be read. It is the most characteristic example of the methods of the beginning of the campaign. We learn how, in the attack without definite plan, each brigade of infantry, each group of artillery, marched in so many distinct columns, operating each on its own account, and what result is arrived at, with a disposition which does not assure the cooperation of the several arms. We learn how the artillery of Colonel Long, 2 batteries and 6 navy guns, advanced alone in front of a brigade of infantry to within 600 meters of the underbrush which bordered the Tugela and 1,100 meters of Fort Wylie, which it had for its objective, and how, at this distance—much too close—it was reduced to silence; how, finally, by this isolated action and the subsequent lack of sufficient action on the part of the infantry, this battle terminated with the loss of the guns.

But let us return to Captain Gilbert's chapter of conclusions. After having shown the violation by the English of the law stated by General Langois, the author shows how this law has been established in the work already cited and how its rôle is destined to be still further enlarged with rapid-fire artillery. Without being able to follow this whole study, let us indicate the logical sequence of ideas. Making first a comparative study of the materials which have succeeded one another since 1870, the general finally advances the following propositions concerning the employment of rapid-fire field artillery:

1. To open fire at a decisive range (3,000 meters).
2. To fire with all rapidity.
3. In order to avoid this overwhelming fire, to take advantage of cover.
4. For the same reason, to decline priority in opening fire.
5. To put in line the least number of guns which will surely produce the desired effect, both so as to display as little of our

strength as possible and to secure afterwards for our artillery the most advantageous situation.

This is the principle of *economy of forces* which the new French regulations applies in creating the term and the notion of *batteries in position of observation* (*batteries en position de surveillance*).

This last rule implies a change from the principles of 1870. We no longer seek to push into action at the moment when the mass of batteries of the main body has joined the batteries of the advance guard; we wait until the enemy, unmasking superior forces, brings on the general artillery action.

When, in the time of Napoleon, with an effective range of 700 to 800 meters, fire was opened at 500 meters, every battery engaged was a battery expended. Hence the necessity of batteries kept in reserve. With the artillery of 1866 and of 1870 and effective ranges of 2,500 meters, results, at this distance beyond the range of small arms, still left the batteries at the general's disposal. The artillery remained available; we had the privilege of employing all of it from the beginning. With artillery provided with shrapnel and opening fire at 3,000 meters, batteries which have the worst of it in a struggle in the open against hostile batteries will be immobilized by a small number of pieces and will not be able to limber up. Artillery with shrapnel ceases then to remain available, once engaged. General Langlois was alone in discerning this fact in 1892. Hence he has only to emphasize his views when dealing with rapid-fire artillery. Thus:

In a fight between two batteries of the old bronze material, if one succeeded first in inclosing the other in a rectangle of 100 by 250 meters deep, 10 or 15 minutes of distributed and sustained fire sufficed to put out of action half of the unprotected personnel. But with the rapid-fire gun all the personnel of the gun detachment can find shelter behind the shields and may suspend the action. As the adversary can not fire indefinitely, the side which had been worsted may profit by a lull to reopen its fire. The initial struggle from cover to cover leads then, at most, to the silencing momentarily of one of the two adversaries. The artillery duel will no longer afford a definite solution, as it did between batteries using shrapnel without shields. It leads to a delaying action.

But if the infantry takes a hand, a new factor presents itself—the artillery will be obliged to advance to the military crest. Unmasked, the batteries will be then completely immobilized or destroyed. So, skill will consist in forcing the adversary to unmask himself, while remaining sheltered yourself. To obtain this result it will be necessary to push your infantry to the front. It is by the combined and intimately associated working of the two arms that one is absolved from useless and resultless cannonades.

This is the principle of the cooperation of the three arms, unheeded by the English. The artillery must by its fire force the adversary to shelter himself, in order to facilitate the attack of its own infantry. The defense will be menaced only at the moment when it unmasks itself to fire. This moment is short and the rapid-fire gun will take advantage of it better than the old material.

Returning, then, to the examination of the events of the Transvaal, the author notes the absence of shrapnel effect against troops under shelter and likewise its complete insufficiency against the shelter itself. He recalls how General Langlois insisted on this very important point, the consequence of which appeared to him to be that strong localities with lines of trenches would afford a very good point of support susceptible of a long resistance. The General concluded:

“Field artillery ought not to attempt the destruction of these points of support, walls, localities, shelter trenches, field works; it ought to aim at the defenders.”

But how? Describing the occupation of a position put in a state of defense, where the troops remained hidden in the trenches, the supports and reserves well sheltered in rear, the general showed that the fire could have no effect.

“Any energetic fire at this time would be wrong.” And he gave as an example the attacks attempted in 1870 against the line of investment of Paris:

“The preparation by the artillery consisted in raining projectiles on the points of support of the line, generally villages, for a considerable time before advancing the columns of infantry: *the fire ceased when the attack moved forward*. This mode of preparation always had for a result bringing the infantry against an unweakened defense, leading it to a repulse or a success too dearly paid for.”

Captain Gilbert adds:

“Does it not seem in reading these lines that they were written for Generals Buller and Methuen? Is it not the history of their long and sterile cannonades, commenced the evening before or two evenings before the action, lasting 24 or 48 hours, then followed by a delay of several hours? Is it not the history of Magersfontein, of Venters-Spruit, of Vaal-Krantz? The English would certainly have been greatly benefited by studying the solution proposed by General Langlois—that is to say, the intervention of the assaulting infantry, the cooperation of the two arms in the attack.”

As soon as the assailant arrives at 1,200 or 1,500 meters the defense will be obliged to line the parapets, and in order to fire it must unmask itself and become vulnerable. It can all then be summed up in this axiom:

“The preparation by the artillery must take place during the actual advance of the infantry under the fire of the enemy’s rifles; it must be violent. The action of the infantry must follow immediately that of the artillery.”

Is this not precisely the principal conclusion from the campaign which we have seen offered by the German officer who took part in it. Without having developed the subject so extensively, he pushes the application of this axiom to the limit, since he is of the opinion that the artillery must sustain its infantry up to 100 meters from the enemy, even at the risk of inflicting some losses upon it, so important is the support.

Thus the shrapnel, very effective against unprotected targets, has shown itself harmless against shelter.

To remedy these imperfections explosive shell were introduced, which were expected to successfully replace shrapnel in this last case. It was believed that nothing could resist them. But the expectations of their effect have not been fulfilled, either against obstacles or against troops under cover. General Langlois wrote: “To dream of the destruction of the border of Fröschwiller or of Saint-Privat was pure folly; all the munitions of an army corps transformed into elongated shells would not have sufficed to demolish one of these villages.”

The example of Modder River, bombarded an entire day by Lord Methuen’s shells and all of whose houses were still standing in the evening, confirms this assertion. Though inhabited places preserve their value even before torpedo

shell, the true objective of artillery continues to be not the cover but the defender placed behind this cover. But there, again, we meet with the same disappointment. The fragments of the projectiles are so small that they lose their force at 10 or 15 meters from the explosion. And this was an especial defect with these projectiles. The only superiority that can be given them is their very great effect when they burst in an inclosed space. The facts of the war confirm these statements. At first the high explosives terrified the Republicans; but as soon as the first astonishment was passed, they became accustomed to them because they saw that lyddite did not produce great destruction. Here is a striking case. A Boer, between whose legs a lyddite shell burst, was thrown into the air and fell on a sack of flour, without suffering the least injury. On the other hand, here are two cases of considerable effect in a closed place. A melinite shell, bursting in an officer's mess at Ladysmith, did great havoc; and likewise a lyddite shell, bursting in a room at Modder River, killed the seven burghers who were there.

If General Langlois attributed to high explosives a very secondary value, quite different was his appreciation of smokeless powder. It modifies considerably if not the battle, at least its first engagements, since it increases the difficulty of reconnoissances and leads armies to become engaged under unknown conditions. Each arm, taken by itself, is powerless to solve the enigma. Reconnoissance by the artillery has given its negative proofs at Colenso, Modder River, and Magersfontein, and in almost all the battles of Natal and Orange. A few rifle shots will suffice to stop cavalry, which was likewise the experience in Africa. As for the infantry, a few isolated men will accomplish nothing; and as soon as a fairly important force is employed we will see them put to the alternative, either of going to a certain death, or recoiling under a murderous fire, or awaiting the support of artillery. It is, then, the cooperation of the three arms which is necessitated, and quite naturally it will be the advance guard consisting of all three arms which will be the true instrument of reconnoissance.

As to this gaining of contact being rendered more difficult for the assailant by reason of smokeless powder, General

Langlois draws two conceptions: the game of *advanced lines or screens of artillery* on the tactical checkerboard and the game of *covering detachments* on the strategic checkerboard. To covering detachments, the offensive will oppose *advance guards of exploration*; to advanced lines, *advance guards reenforced* by the mass of artillery. Advance guards of exploration and reenforced advance guards are only modes of application of the same principle—that of action from deep formations (*en profondeur*). Before this principle the old idea of the line of defense is obliterated.

We can not follow the entire development of this new idea as it oversteps the limit of our subject. Let it suffice to say that the author, examining in its light the events of the Transvaal, notes that we find on the part of the Boers a certain notion of gaining several points of contact, and of the employment of covering detachments or advanced lines—for example, in the battles which Cronje fought before his position of Magersfontein. On the other hand, the English, with their premature deployment of all their forces on the whole front, ignored completely this principle of action from deep formations. Enlightened upon the difficulties of gaining several points of contact, they sought to avoid the difficulty by covering their approach under the darkness of night. This is an expedient which may be suitable for the storming of a post; we know what resulted from it at Stormberg and Magersfontein.

Captain Gilbert's book stops here. Some lines, added after his notes, give his conclusions: "For the war of the future the lesson to learn from the present war is this:

"The difficulties of reconnoissances and of gaining contact, resulting from the considerable progress realized in armament, show the necessity of advance guards and of covering detachments, and justify the employment of advanced lines of artillery. The struggle on the field of battle must be carried on from deep formations if one wishes to derive benefits from reserves.

"The same motives lead equally to increasing the front of the defensive deployment. The defensive front of an army corps may, at need, have an extent of 8 to 9 km. to the great advantage of the principle of economy of fire and to facilitate

the use of the reserves. The latter may then act either *en profondeur*, or at the chosen point of the front, or even preferably in the form of groups detached on one wing or on both wings.

"An army of four corps occupying thus 20 km. would have two of its corps at the center for the frontal fight, those of the wings reserved for maneuver.

"Finally, I have reserved intentionally the lesson which I regard as essential"^a

As we have seen, Captain Gilbert shows himself a great partisan of the ideas of General Langlois. We have no intention of discussing them, since this article is purely objective. We have referred to them along with the observations of Captain Gilbert, because in his work the observations constantly proceeded from these same ideas. It is interesting to note the part they have played in the elaboration of the new regulations of the French rapid-fire field artillery.

Thus the notion of *batteries in position of observation* flows from the principle of *economy of forces*; but if this point of view has prevailed, everyone does not appear to be in accord as to its application. Let us point out, for example, the reserve with which Maj. G. Rouquerol speaks of it in his recent work, *Emploi de l'Artillerie de Campagne à Tir Rapide*. "It would be fatal," says he, "if we make of it a general rule." Likewise a rigorous application of the principle of action *en profondeur* to advanced lines of artillery does not meet with the unanimous acquiescence of tacticians.

Finally, if the employment of modern arms seems to permit giving a greater extension than in the past to a defensive front, ideas vary much as to the degree of the extension permitted. Thus in Germany they are contented in general to admit the more modest figure of 5 km. for the defensive front of an army corps.

^a What is the essential lesson of which Gilbert wished to speak? Death has prevented him from revealing his thought, and it does not pertain to anyone to try to substitute themselves for him. All his friends—that is to say, those who had the honor of approaching "the greatest thinker of the French army"—will know how to conclude. (General Bonnal's eulogy of Captain Gilbert.)

EXPERIENCES OF THE ENGLISH IN THE SOUTH AFRICAN WAR AS REGARDS CLOTHING AND EQUIPMENT.

By Capt. VON HAEFTENN, Great General Staff.

Translated from the Quarterly of the German Great General Staff for 1903, for the Second Division, General Staff, U. S. Army, by Capt. JACOB F. KREPS, Twenty-second U. S. Infantry.

Had the English officer in the South African war shown himself as thoroughly an educated, experienced tactician as he proved himself a conspicuously practical individual, the English people would have been preserved from many disagreeable disillusion. Whatever in the war, in the province of organization, administration, and especially of practical military clothing and equipment of the troops has been accomplished, under the pressure of necessity and the influence of the late experience in the field, deserves in a high degree our attention. In this respect more can be learned from the English than directly in the province of tactics. Outside of their thoroughly practical sense, the experience of the numberless small colonial wars, as well as their not insignificant knowledge acquired in the domain of sport, and of a practical sanitary régime, rendered material aid to the English in solving the questions under consideration. And that the average Englishman is practical no one will justly deny.

In the selection of suitable military clothing and equipment of the army employed in South Africa, has this practical sense been especially evidenced. According to the general experiences of this war a suitable and proper war uniform must fulfill two conditions, viz:

1. A war uniform must, as regards its color, conform to the landscape of the seat of war, so that its wearer may be as unobservable as possible, as in the absence of rifle smoke on the firing line lies the most important means of protecting the troops from unnecessary losses. It here behooves us to

follow the example of nature, which furnishes many animals as a means of protection, the color of the country of which they are natives.

2. A war uniform must, as regards the selection of cloth and fit, fulfill the highest demands of comfort and hygiene, in order not to unnecessarily increase the physical and mental exertions of the soldier, which in war, and especially in modern combat, are already great enough.

The experiences of the Boer war of 1881 had already demonstrated that uniforms of red or blue were unpractical in the clear atmosphere of South Africa, and in the open and treeless character of the terrain, as they made their wearers visible at a great distance and brought upon the English, opposed as they were to a foe who, like the Boer, understood how to make his weapon efficient, even at great ranges, unnecessary losses. This disadvantage had increased in importance, due to the adoption of the practically smokeless powder of the modern weapon.

Nevertheless, on the part of the English war office, presumably caused by an ill-timed economy and by respect for antiquated traditions, which are possibly more valued in the English army than in ours, nothing was done to conform the uniforming of the English army to the demands of modern warfare and to undertake a radical change in the same. But one-half year before the opening of the South African war the uniforms were throughout of blue and red color. First, during the summer of 1899, when the outbreak of the war could be foreseen with tolerable accuracy, these important experiences were remembered in the English war office, and new uniforms, of which, in the summer of 1899, not one thread had been woven, were provided in all haste for those troops which in all probability would be first for detail to South Africa. Thanks to the exceptional ability and equipment of the English industries, it was possible by October to nearly clothe the first 40,000 men transported. The director-general of ordnance of the English war office, in a report of January 11, 1900, writes of this as follows:

“The greatest of my difficulties grew from the fact that previous to their departure for South Africa, the troops ordered for that service had to be newly clothed from head to foot. With the infantry, the blue helmet had to be replaced

by a white one and the red blouse by one of khaki duck.^a After the embarkation had already begun orders were given to replace the khaki duck with khaki woolen fabric. Hardly had the manufacture of the khaki wool been begun when a new pattern of service blouse was introduced; this had to be abandoned because the contractors protested on account of the difficulties of production.

"In place of the summer-cloth trousers, were substituted, first, those of khaki-colored duck and later those of khaki-colored wool. Even the boots had to be changed, as the shoe material for foreign service is different from that for home service. Also in the case of the artillery and cavalry great difficulties had to be overcome; in place of cloth-riding trousers those of cord were introduced. The knee boots were replaced by wrap leggings and shoes. Similar alterations had to be introduced in the uniform of the special corps.

"I leave it to any one to decide whether or not the method above described of outfitting troops is, in general, practical and suitable to the needs of an army that is first for duty in case of war. I recommend that as the greater part of our troops are now clothed in khaki colors the opportunity be embraced to introduce khaki as a similar color for the service uniforms of the army."

According to the report of the Royal Commission on the war in South Africa, the overcoming of the difficulties encountered in the new uniforming of the troops, entailed a not insignificant outlay of funds. Had the English war ministry earlier undertook the solution of the exceptionally important problem of uniforming the troops many millions would have been saved.

The color chosen for the new uniform, khaki, was a blending of yellow, gray and brown. Undoubtedly this was a happy choice of colors for the South African landscape, as it primarily conformed to the surrounding natural colors of the country, and proved itself the most neutral color for South Africa. During the subsequent course of the campaign, after exposure to sun and rain, the khaki colors assumed all possible shades, from brown with reddish shimmer, to grayish green.

^a Khaki is an East Indian word, and means a yellow dust or powder. By the term "khaki," as used in this article, the color, not a material, is meant.

But all these shades were more or less neutral in the South African landscape. The present color of the English "service dress" matches tolerably accurately the khaki shades tested in South Africa. However, this color is probably by no means the only one fit and proper for Europe; in the middle European countries where there is much more green in the landscape and the atmosphere by no means as clear as in South Africa, the khaki must have a toning of green. According to the report of an English officer who was present at the great English maneuvers during the preceding summer, the khaki color—a mixture of brown and gray—universally adopted in the English Army at the present time, was distinguishable at a great distance upon a green background; on the contrary, upon a gray or brown background their firing lines in khaki were scarcely visible to the naked eye at a comparatively short distance. "It has repeatedly happened," continues the report, "that notwithstanding the fact that my eyes are very good, I have first observed, without glasses, deployed infantry on an open terrain only after they had advanced a considerable time over an open plain, and then only after I had sharply scrutinized some particular locality called to my attention for some reason. Then, when the field glass was used, numerous skirmish lines were discovered which had before been invisible."

The experiments recently undertaken in England have demonstrated that the dark mouse-gray colors, with a slight greenish tone similar to the color of the uniform of our East Asiatic brigade of occupation, stands out the least, in the European atmosphere, from the different nuances of the terrain, and for our part of the earth's surface must be considered the most neutral color. In the combats of the South African war it was the experience that troops in motion at over 600 meters were the least visible when the color of their uniform was a shade lighter than that of the locality. Darker colors as well as red, and especially white, attracted in the greatest degree the eye and fire of the enemy.

On this account, shortly after the first encounters, the "Scots Grays" began of their own volition to color their gray horses khaki, well knowing that a cavalryman upon reconnoissance duty must be as little visible as possible. It was entirely out of the question to conduct a successful recon-

noissance upon gray or white horses that are visible at such great distances.

Likewise the Highlanders, whose dark kilts offered a splendid target to the Boer riflemen, replaced them with khaki-colored shirts, and the artillery strove to merge itself into the surrounding landscape by painting the guns and carriages a khaki color. Only the ambulances preserved a bright color as striking as possible, so that they should stand out to the greatest degree against the surroundings.

Between the uniforms of the separate branches of the service, as well as between regiments, there was absolutely no difference of color in the uniforms; but one color of uniform was seen, namely, khaki. On this account it was extremely difficult for the Boers (and often to their great disadvantage), to determine whether they had cavalry or infantry opposed to them. The long tenacious operation by which the Second Cavalry Brigade, Broadwood, consisting of hardly more than 1,000 men fighting on foot, held the Boer army of over 4,000 under Cronje at bay at Koedoesrand Drift for a whole day, February 17, 1900, and thereby sealed its fate, was partly made possible by the fact that the Boers did not recognize the cavalry as such, and were of the belief that they had English infantry opposed to them. Had Cronje known that only a small part of the cavalry division blocked his way, he surely would not have permitted himself to be long held back.

The disadvantage which existed within their different organizations (no distinction in uniforms between regiments) was obviated by an order of November 2, 1899, which specified that each regiment should wear upon the left side of the helmet directly over the ear its particular regimental ornament, which formerly had been worn upon the shoulder strap.

But far more than the differences of colors, any glittering or shining article drew the fire of the enemy. "The smallest shining metal button operated in the sunlight like a miniature heliograph," so runs the report of an eyewitness from the seat of war. Even a metal mounting on the straps, the clasp of the sword belt, the bright mess equipment of a soldier prone on the ground often betrayed the position of the line and frequently caused the troops unnecessary losses. With the "Guard" at the fight on the Modder River, November 28, 1899, it was observed that the aluminum telescope of an

officer, and in another case the aluminum canteen—the location of the line being betrayed in no other way—attracted the not agreeable attention of a machine gun located 1,400 meters distant. Even the polished leather of the equipments reflected the sunlight and had to receive a dull finish. Our colonial troops in South Africa undoubtedly have lately had the same experiences. The disproportionately great number of casualties among officers and noncommissioned officers who wore the officers' side arms, is traced in part to the gleaming of the steel scabbard, which attracted even at great distances the eyes of the keen-sighted native-born Boers.

The English must have had the same experiences in regard to the Boers; the consequence was that following the very first engagements of the war, a complete revolution in the uniforms of the officers was accomplished. Everything glittering or shining was removed; the officers' side arms, which had been proved not only useless but absolutely dangerous to their wearers, completely disappeared. The strap of the "Sam Brown" belt worn diagonally across the chest, was laid aside, and likewise the stars and crowns upon the shoulder straps; in fact all insignia that distinguished officers from enlisted men were removed. The pattern of the officer's blouse was made to conform accurately to that of the soldier's; in place of the saber, the officers carried carbines. This idea in itself well grounded in principle, was carried to excess. Surely it was absolutely necessary to protect such a costly hard-to-be-replaced officers' corps from unnecessary losses; but insignia of rank, visible marks of difference between commander and commanded, must exist, for the leader must always be easily recognized and discoverable by his followers. Later, in the course of the war, the officers resumed their insignia of rank, which, however, were made of brown or bronzed metal and were worn generally on the back of the blouse collar.

In a general order from the general headquarters dated February 5, 1900, the following appears, viz: "* * * it is difficult to distinguish the officers in their present equipment and uniform, and it seems very desirable that they should wear some distinguishing mark either upon the back part of the blouse collar or on the back of the blouse itself." Nevertheless, infantry officers carried the carbine during the whole

campaign. However advantageous this might have been in hiding the officers as such from the enemy, it had this great disadvantage that they (the officers) took part in the firing during the engagements instead of directing their attention to the enemy in general and to the supervision of their own particular commands.

On this account it has been proposed to arm the officers with a fire weapon, only for the purpose of deceiving the enemy, and to deprive him of ammunition for the same in order to remove the temptation to take part in the firing. The best weapon for the leader in the modern combat, a combat that must be carried on and completed at great distances, against an enemy in a very inconspicuous uniform and against a practically smokeless powder, is the field glass, and moreover, the best that modern ingenuity can produce. This was recognized by the English, also, during the later course of the war. All officers, and to a great extent noncommissioned officers also, were equipped with a very good field glass, part in fact with the costly Zeiss instrument.

No small difficulty was experienced by the English war ministry at the beginning of the war in the selection of a suitable material for the new khaki uniforms. At first it was made of duck and a light, half-wool serge; these two stuffs, however, during the course of the war did not stand the test, as they, although light, were very warm on account of their thick and impervious web and in the tropical climate uncomfortable to wear.

In a land like South Africa where the thermometer often within 12 hours ranges 25° R. ($56\frac{1}{4}^{\circ}$ F.), material wholly of wool is the best; it is the best adapted to every climate, every season, to rain and drought, heat and cold; therefore, later in the war, uniforms were made entirely of woolen material, principally woolen cloth; it had, it is true, this disadvantage, that the soldier while advancing through underbrush is easily caught by the limbs and brambles and is likely to tear his uniform; in a seat of war like South Africa, where there is a great deal of briery underbrush, it is more practical to choose the smoother cord as a material. In order to preserve the hygienic advantage of the wool, the blouse was lined with a light flannel. Later the duck blouse, during the warm season,

was issued to the garrison troops and those of occupation, who were less exposed to the influences of the South African climate; here the canvas proved satisfactory.

As regards the pattern of the khaki uniform blouse, it was a model of practical comfort, and it had been well provided, that the physical and mental efforts of the soldier, who in present warfare must fight for hours, even days, in a prone position, should not be unnecessarily increased by a binding, cramping fit of the uniform. It fitted so comfortably that the soldier could run, climb, crawl, and sleep in it, absolutely free and unconstrained. During the first period of the war, particularly during the advance of the army under Lord Roberts upon Bloemfontein during the days of Paardeberg, both officers and men did not remove their clothes during a week or even longer without finding it especially detrimental.

The khaki uniform was worn in this war willingly and contentedly by everyone. It fitted loosely, so as to make allowance for shrinkage due to moisture and to permit the wearing of a vest or of similar under-garments. It was very comfortable about the neck. For the standing collar formerly worn, a rolling collar with two hooks had been substituted; under this, ordinarily, a khaki-colored silk neckerchief was worn, which was very comfortable; the wearing of a standing linen collar was exceptional. The enlisted men at the outset wore nothing under the collar; this proved, however, disadvantageous, as the perspiration soon penetrated the collar and made it stiff. Later, in many organizations, a woollen neckerchief was selected for the soldiers. The blouse had on the exterior four large pockets, two on the chest and two on the hips; and in addition to these, one in the lining of the front part of the skirt. All the pockets were made to button. The four large pockets proved excellent for carrying ammunition and rations, as the troops on many occasions laid aside all dispensable articles of the equipment before entrance into battle.

Very practical were the small leather straps placed on the blouse cuffs; the sleeve in rainy weather could be buckled close around the wrist to prevent the entrance of the rain water.

The new uniform trousers were made of Bedford cord, a somewhat heavy but uncommonly durable material. They were cut according to the pattern of the English riding trousers,

for all arms of the service, mounted or dismounted, and were accompanied by leggings. This covering of the lower extremities proved excellent for war purposes and is worthy of imitation. Cases of chafing in the mounted troops were the exception; even during the extremely trying operations for the relief of Kimberly and the pursuit of Cronje in the middle of February, 1900, no such cases were reported in French's cavalry division. The practical qualities of these English riding trousers lie in the close-fitting cut under the knee, in the great breadth of the seat, as well as the great length of parts covering the upper thigh, which permitted a free comfortable movement of the knee; from the knee down the trousers fitted snugly; around the ankle they were either strapped or buttoned; then where the leg pressed the saddle there was no seam.

As foot wear, the high or half boot, such as is worn by us, was everywhere tabooed. The Englishman, thoroughly experienced in the school of sport, rightly reasons that a mountain climber or a runner would never select such a foot covering, as it makes the escape of the foot exhalations very difficult and renders the skin of the foot very sensitive. After it has been wet the boot is drawn on with difficulty; moreover, it is very difficult to accommodate it to a chafed or galled foot. In the English army during the campaign only the lace shoe was worn by all arms of the service. It had no tongue, the flap under the lacing was made of one piece with the shoe so that water could not enter. The mounted troops fastened to the lace shoe a buckled spur, which, however, was placed above the heel so as not to interfere with the soldier in moving on foot. This foot gear proved very satisfactory during the whole campaign, in all seasons of the year, and especially in severe rainy weather and in heavy clayey soil.

The different arms of the English service had, therefore, notwithstanding here and there very long marches, extremely few foot troubles. For example, the Sixth and Ninth Divisions, in the pursuit of Cronje from the 15th to the 18th of February, during which period they had several very extraordinarily long marches to make several days in succession (several detachments over 45 km. in a day), had very few cases of sore feet. The exact number has not been officially made known. In consequence, the two divisions early on the morning of

February 18 were able to give battle in practically full strength. This fortunate result of the pursuit is in part to be ascribed to the good foot wear. Moreover, lace shoes or short boots are ordinarily obtainable everywhere in an enemy's country, but high boots very seldom.

In connection with the lace shoe and riding trousers the English soldier wore the "puttie," a kind of legging in the form of a bandage, made of a strip of khaki-colored, very thick flannel, $2\frac{1}{2}$ meters long and 12 cm. wide, which was wrapped around the leg from the knee down. This bandage upheld the calf of the leg very effectively and gave it, in marching, an excellent support. The putting on of the bandage required at first some little practice, but later the soldiers could put it on or take it off in less than a minute. The puttie reached from the knee down to the shoe, to which it had to be very carefully adjusted, in order that in rainy weather water could not enter the shoe from above. In cold weather the puttie was as warm as leather. If it were wet through by the rain it acted like a wet bandage during the march, and during a rest could be easily and quickly removed and replaced by another. Later, however, the putties were replaced here and there by others of waterproof material. In warm weather these leggings were more comfortable on the leg than leather ones, as they were not so warm and permitted to a greater degree the escape of the exhalations of the leg. An appreciable advantage was that in lying down, either during an engagement or for the purpose of sleeping, they exerted no pressure as leather leggings ordinarily do. In packing they took up such very little room that every soldier could carry one or two pairs of putties with him. Washing and cleaning of the puttie was quickly and easily accomplished; they dried in the air in a very short time. Few of the officers wore the puttie. The greater number used the puttie legging of thick, stiff leather.

Officers and soldiers of the regular troops wore the cork helmet as a head covering, which proved to be an impracticable head gear. Its stiff form interfered greatly with the soldiers while firing, especially in the prone position, and while resting the same quality showed itself as a disadvantage. In addition, on account of its white color, it was visible in battle at long distances, and offered to the Boers a splendid target.

The consequence was that ordinarily the troops removed it in battle; at Colenso, December 15, 1899, and Paardeberg, February 18, 1900, where a scorching temperature prevailed under a cloudless sky. The result was that the men suffered greatly from the sun's heat, direct and reflected, and a large number experienced sunstrokes. The khaki-colored, wide-brimmed felt hat of the colonial and volunteer contingents proved to be much better. It was light, did not bind, protected against the hottest sun's rays, as it was doubled or lined, and it could be worn while shooting or sleeping. A leather chin strap served to retain it in place during running, riding, or in a strong wind. The material out of which the hats were made was compact and durable, so that rents in the felt very seldom occurred. Our older experienced officers of colonial troops characterize the last as "the best of head gear for all climates so far experimented with." It has, as opposed to the helmet, in connection with which a cap must always be carried for use, the advantage that it in itself answers all purposes as a head covering. The vizorless English field cap, which covers only a part of the head, was entirely unsuitable for use in the hot sun's rays.

At the commencement of the cold season the army was issued the warm Indian uniform coat of thick woollen cloth and lined with flannel. It was drawn on over the uniform, had a row of horn buttons, and was patterned in the form of a jacket, so that it could be comfortably used on mounted duty. Both officers and soldiers prized it highly. The long, wide English cloak of thick waterproof blue cloth was not well liked, and was considered more as a burden than as an object of comfort. General Hilyard, before the Royal Commission, criticised it very unfavorably as follows: "The cloak was not worn by our soldiers on account of its striking colors and of its great weight; when rolled, the large size of the cloak, even when the men were in the prone position, offered the enemy a very favorable advantage."

As to underclothing, every man wore thick cotton drawers, thick woollen stockings, a woollen undershirt with half sleeves and fully covering the trunk, and a blue flannel shirt. An important part of the small clothes was formed by the wide flannel abdominal bandage. According to English opinion, it should form a part of every military clothing outfit.

In the infantry, in addition to his rifle, every soldier carried the side arm with waist belt, the two large cartridge pouches, cooking utensil, canteen, and a large linen haversack.

The additional equipment, viz, knapsack and contents, intrenching tools, blanket, and tent outfit, was transported with the baggage. The weight of the equipment carried by each soldier was only 19.6 kg. ($42\frac{1}{2}$ lbs.), and in consequence less than that of the German (27.8 kg.-61.16 lbs.) and French (26.5 kg. = 58.3 lbs.) armies. This lightness of equipment explains in part the various splendid marches and the extremely small number of sick therefrom.

Of the parts of the equipment before named, the cartridge pouch decidedly failed to stand the test. Its principal fault, according to the report of the Royal Commission, was that, when the soldier was double-timing or running, the cartridges very easily fell from the pouch. Likewise Lord Kitchener strongly criticised the pouch: "Our great loss of ammunition in this campaign, which furnished a source of supply to the enemy, was less to be ascribed to the lack of care on the part of the soldier than to the extraordinary inutility of the part of the equipment in which he had to carry his ammunition." After the first engagements the cartridge pouches were thrown away by many of the men and replaced by cartridge belts such as the Boers and various colonial organizations wore. These belts, however, were made for single cartridges only and did not hold these in a sufficiently firm manner, while those of the Boers were made to hold clips of cartridges. The Royal Commission therefore, strongly recommended in its report the adoption in the English army of a cartridge belt such as was worn by the Boers, as by its substitution for the pouches the serious and unnecessary loss of ammunition by the soldiers in rapid movement could be obviated most speedily. The method of carrying ammunition employed by our colonial troops is very practical; also the clothing and equipment of this corps, as well as that of the East African "Besatzungs Brigade," in this and in other respects seem suitable for active service, and in various details, after judicious modifications, seem worthy of imitation for European conditions also. By the above-mentioned troops the ammunition is carried in clips, the clips being placed in small pockets, each of which contains from 2 to 3

clips (10 to 15 cartridges), these pockets being fastened to the broad waist belt and slings.

The large linen haversack was primarily made of white material, but during the campaign was colored khaki; it served at first the same object as ours in Germany. As the knapsack, however, was very heavy, and, when packed, badly balanced upon the back for carrying (Sir Charles Warren, in the presence of the Royal Commission, characterized the English knapsack as "an absurdity"), it was later not carried by the men, but left with the baggage. From this time on the soldiers placed the absolute necessities in the haversack and this latter became later, in addition to its original purpose, a substitute for the knapsack. Although primarily carried by means of a broad strap passing over the right shoulder to left hip, or by means of two hooks fastened to the waist belt, it was ultimately borne as a pack upon the back, and, like the German knapsack, the weight was supported by two slings passing over the shoulder and the pack fastened to the belt. The two large cartridge boxes formed the counter weight.

In the haversacks, as a rule the soldier, in addition to the absolutely necessary cleaning material, carried an iron mess can, a ration of bread or biscuit, the woolen cap, a pair of woolen stockings, as well as (when a fight was in prospect) ammunition. The other personal effects of the soldier, as well as extra clothing (1 pair canvas shoes, 1 flannel shirt, 1 pair underdrawers, woolen stockings, puttie, sewing outfit, towel, soap), were ordinarily packed in the knapsacks. It was left, however, to the judgment of the commanders of the tactical units to direct changes, in every special case, in the marching order of his men. In this way the troops could from time to time be made independent of the baggage train, and it not seldom happened that individual commands did not have their knapsacks at hand for many days without specially missing their contents; for example, the troops that took part in the combat of Spionkop were compelled to shift without them from the 15th to the 27th of January.

Undoubtedly the marching ability of the English infantry was greatly increased by the small burden carried by the individual soldiers; on the other hand, the train on this same account was not materially increased. This increase in the train was not especially noticeable in South Africa on account

of the comparatively small number of troops employed, but in the case of the tremendous armies of the great states of Europe, the train would be immeasurably increased. The weight of equipment, etc., now carried by the English infantrymen is determined for every occasion by regulations based on campaign experience similar to those before described. In the last maneuvers, according to the report of an eyewitness, the baggage train of a battalion, the strength of which was only 500 to 600 men, consisted of from 13 to 15 wagons. A similar increase in the train under our conditions is impossible, and in consequence the German soldier must carry with him all that he needs, however disadvantageous the increase in weight carried may be.

The canteen was made of aluminum, and over it a thick khaki-colored covering of felt was drawn; this before and, if possible, during the march was wetted, so that the contents, even in very warm weather, remained cool for a long period. Issued to the soldier as part of his equipment was a large, strong pocketknife with a ring, by which (with a small chain) it was suspended to the back part of the belt.

The majority of the English officers called before the Royal Commission delivered a very unfavorable opinion on the entrenching tool carried by the men. The small spade, which is similar to the German one, was considered too weak; it was more burdensome than useful. Later a strong entrenching tool was issued and was transported in small, light, mule carts which closely accompanied the troops. In many cases pack mules were used to carry not only the entrenching tools, but also ammunition. One pack mule was sufficient for a company.

With the cavalry the question of the weight to be carried by horse and rider was of greater moment than with the infantry. Concerning the reasons for the great loss of horses in this war,^a opinions, it must be admitted, are widely divergent. However, very noteworthy opinions, among them that of the commander of the cavalry division of General French,

^a For example, the cavalry division (French), which at the beginning of the operations under Lord Roberts, early part of March, 1900, had about 4,800 horses, lost over 2,000 during the advance on Bloemfontein, February 12 to March 13.

were to the effect that a material source of the great loss was the too great burdening of the horse,^a especially at the beginning of the campaign. It was sought to rectify that defect by the provisions of several orders. The following appeared in a general order of February 5, 1900, from general headquarters, viz: "On cavalry reconnaissances and patrols which in all probability will have a duration of not more than one day the pack and equipment of the cavalymen will be lightened as much as possible, and nothing will be taken along except what is absolutely indispensable." Simultaneous with this the following order to all mounted troops was issued by the chief of staff, Lord Kitchener:

"CHIEF OF STAFF,
"Cape Town, February 5, 1900.

"The following suggestions concerning the diminution of the weight of equipment, etc., carried by the cavalry horses is hereby brought to the attention of all concerned. They have been compiled by Major Rimington, of the Sixth Inniskilling Dragoons, and are the result of the personal experience of this officer during the present campaign. The commander in chief expects from the commanding officers of all mounted troops that they will do all in their power to diminish the weights carried by the horses in so far as it may be possible.

"KITCHENER OF KHARTOUM, A. B.

"Chief of Staff.

"The following make up the equipment of man and horse: (1) a warm cloak; (2) cooking outfit with one ration; (3) grain sack (reserve ammunition, if necessary, can be carried therein); (4) a good halter of neat's leather (colonial pattern); (5) wire cutter; (6) carbine (to be carried by trooper); (7) cartridge belt with 50 cartridges (also to be carried by soldier); (8) haversack with 50 cartridges (carried by soldier); (9) knife and lariat; (10) canteen; (11) field glass; (12) knife, fork, and spoon (in haversack); (13) saddle of the Cape police, made according to English pattern, and blanket.

"Of the former carried equipment the following are to be left out: (1) clothing bag and contents; (2) horse-grooming

^a Weight of rider (of light weight) included, it amounted to from 19 to 20 stone (266 to 280 lbs).

outfit; (3) horseshoe holders and reserve shoes; (4) hay net; (5) extra shoes; (6) breast straps; (7) tent pegs; (8) hoof scraper.

"The following articles wrapped in a blanket and to be loaded upon the wagons: (1) 1 pair light shoes; (2) 1 pair stockings; (3) 1 extra shirt; (4) 1 woolen cap; (5) 1 extra pair trousers; (6) 1 woolen underjacket (carried by soldier during cold season); (7) towel and soap; (8) during the cold season a second blanket is to be added."

General French, before the Royal Commission, advanced a much more radical proposal concerning a reduction of the weight carried by the horse. Based upon his wide war experience, he gave it as his thorough belief that it is especially necessary to unburden horse and rider as much as it can possibly be done; in his opinion, the trooper should carry with him only his weapons and ammunition.

"In a modern war," he continued, "it will surely be necessary for the cavalry, only too often, to pass nights in the open, and to subsist on the country, and frequently, no doubt, it will be unable to find proper forage."

"Nevertheless it will be fully impossible in the future to overburden our cavalry as we did in the last campaign, if we wish it to properly perform its function as cavalry."

General French proposed to attach to the cavalry light carts or pack animals, according to the character of the country, on which all extras in the way of forage and equipments, which formerly were carried on the horse, should be transported. These light carts should closely accompany the squadrons as "first-line transport," while the present regimental "transports" should form the "second-line transport," and the commissariat train the "third-line transport." As a result of the efforts in this direction, the weight of equipment, etc., carried by the horse was so reduced that many cavalry regiments, especially those that arrived later, carried neither saber nor lance, and had the carbine, later the rifle, as the only weapon. In consequence, the cavalry deteriorated in value to nothing but mounted infantry. But that the South African war has taught that the fighting effectiveness of cavalry in the future demands the employment of the fire weapon only is one of the many false doctrines which this war, on account of the little varied character of opponent and seat of

war, has developed. A genuine cavalry will be able to dispense with neither the saber nor the lance, as additional weapons to the firearm, however disadvantageous they may be to the mobility of and on account of the increased weight carried by horse and rider. It is a question, however, if the value of cavalry, as such, can not be enhanced by equipping it with a better firearm, especially one of greater range, as its effective action in fighting on foot is displayed in the majority of cases at great distances, viz, by issuing it the infantry rifle instead of the carbine. With the present method of carrying and holding the carbine—be it upon the back, as now in the Russian and part of the English army (colonial formations), or at the right side, as in the German army—this much to be desired change is not, however, possible.

Later, in the South African war, several of the English cavalry regiments carried the rifle in a vertical position at the left side, the stock resting in a contrivance fastened to the left rear side of the saddle, and with the barrel held fast in the rear of the left shoulder of the rider by a special apparatus. This method of carrying the weapon is the prototype of a new invention by Lieut. Col. J. H. Patterson, D. S. O., of the Essex Imperial Yeomanry.^a

This apparatus is constructed in two parts, one carried by the trooper, the other fastened to the saddle. It consists of a broad leather belt to which, on the left rear part close to the spinal column of the trooper, is fastened obliquely a metal slot about 9 cm. ($3\frac{1}{2}$ in.) long. The rifle when slung is fastened to the belt by means of a stud fixed to the lower band of the weapon, which is inserted in the slot. The rifle thus hangs upright with the barrel to the rear close to the left of the rider's back. In order to transfer the weight of the weapon from the hip to the shoulder, a strap passing over the right shoulder is fastened to the belt. When the rider is dismounted the butt of the gun does not touch the ground.

After mounting the rider transfers the weight of the piece to the horse by pressing the small of the stock into a metal spring clutch attached to the left side of the saddle, which

^a One of these Patterson rifle carriers was under test by the United States Cavalry Board at Fort Riley, Kans., during the summer and autumn of 1904.—Editor.

clasps the piece directly in rear of the trigger guard. The clutch is fastened to a leather frog, which in turn hangs from the back part of the near side of the saddle. A slight blow against the stock is sufficient to force the small of the stock into the clutch.

By the movements of dismounting the piece is freed from the clutch, so that trooper and weapon are separated from the horse. When the trooper is mounted any chance plunge or fall detaches the weapon from the clutch, so the equipment is a source of no danger to the rider. By slipping the stud from the slot the rifle is ready to hand for use.

An opinion as to whether or not this invention is practical in every respect for all military purposes can not be here delivered, as further tests are necessary. It is especially a question if the mechanism, particularly the clutch on the saddle, is sufficiently strong and durable, and if it will not be injured or will not even be an impediment in column and line movements. Assuredly, with this method of carrying the carbine in use, the saber must be worn on the right side. This, however, would be open to no objection. On the other hand, it would divide more equally on the two sides the load carried by the horse. The foundation idea of the invention, however, is undoubtedly sound and practical. It has, as compared with former weapon-carrying equipments, very important advantages. Especially would it not only make it possible to arm the cavalry with the long-range infantry rifle, but also would eliminate the great disadvantage of fastening the weapon, as in our service, to the saddle. The rifle would by this system be attached to the trooper. If he, through a sudden fall or wound, were thrown from his horse, he would not be absolutely weaponless, as formerly. Of course, through the employment of this or a similar carrying equipment, the rider is fastened to the horse; but this disadvantage is only a seeming one, for this fastening is so light that if the rider from any cause is separated suddenly from his horse the piece in every case is loosened of itself from the saddle.

Other advantages of this contrivance are that the trooper, either mounted or dismounted, has both hands free, and the loss of time due to the necessity of removing the carbine from the saddle is dispensed with, so that the soldier is sooner ready

for action. Further, this method of carrying the piece is more comfortable to the rider while mounted than all others, and permits of a free and unhindered use of the lance and saber; moreover, in a hand-to-hand conflict the barrel of the piece protects, to a certain degree, the back of the trooper. Finally, the weight and cost of manufacture of this invention are less than those of former appliances of the same kind.^a

Lieutenant-Colonel Patterson has his invention, which he himself tested in South Africa for two years, to thank for his life. Concerning this, he writes to the author as follows: "During the last war in South Africa I had trotted forward alone upon a reconnaissance and rode, without noticing it, inside of the enemy's lines. Suddenly I was fired upon at short range. I had run upon a detachment of about one-half dozen Boers and received one bullet through the hat and another through the sleeve, but I myself was untouched. As soon as I was fired on I sprang from my horse and threw myself into the high grass that grew in this locality. As I sprang from my horse my rifle had detached itself from the saddle, thanks to the carrying equipment, and remained at my left side. Protected from sight by the high grass, I now crept from the place at which I had sprung from my horse, to a small hillock near by, from which I, in my turn, opened fire on the Boers. Apparently, they believed that they had killed me by their first volley, and were so surprised and frightened by this unexpected fire that they, on their side, took to flight most promptly. I was fortunate enough to kill two of their horses and to wound three of the men. I brought the latter back to our camp as prisoners."

This small fortunate *coup de main* received a flattering mention in a "special dispatch" of Lord Kitchener of July 9, 1901.

During the latter part of the South African war, different organizations of cavalry and mounted infantry tested the Patterson invention. The opinions given concerning it were universally favorable and flattering. Lately, it is true, a few less favorable reports have been received from English officers in

^aFor further on this subject see pages 139 to 142, "Bulletin of Military Notes" for June 30, 1904. — *Translator's note.*

Egypt who tested the apparatus during the last year. They criticize the mechanical part of the invention, and assert that the clutch easily relaxes and sometimes breaks; likewise, that the insertion and removal of the stud into and from the slot is too difficult for the soldier. Other authoritative opinions, however, dispute these disadvantages and declare very decidedly for the adoption of the Patterson invention.

During the past year Lord Kitchener instituted tests of this contrivance in the Indian army. These were so satisfactory that not long since the invention was generally issued to this army. The tests in England have not as yet been completed.

The experiences of the South African war have instilled new life into all departments and branches of the English army. In addition to reforms in the tactical instruction of the troops, and in the organization and administration of the army, the war has brought about a complete revolution in the clothing and equipment; everything antiquated has been rejected and the experiences of this war have been fully utilized. The unanimous opinion of all officers educated in the school of war experience, is that the question of clothing in war is such a great and serious one that human vanity or former small formalities can have no voice in the matter. Hence, the uniform worn and tested in South Africa was, before a twelve months had passed, adopted in the English army as the so-called "service dress." It is in many respects to be looked upon as the model of a practical, war-service uniform, from which, before all, everything polished or shining has been removed. It has, moreover, the advantage of being becoming and of having a thoroughly military appearance.

In the opinion of a military expert who, the past summer, during the English maneuvers, for the first time saw the new uniform in use, "the new field dress is not only a practical and simple but also a becoming war uniform; the cloth gathers little dirt, and, notwithstanding the bivouac they had just made in the rain, the troops made an orderly, tidy, very military appearance."

With a proper appreciation of the value of the traditions attached to the former uniforms of many organizations, the English army administration has been regardful of them when

possible, and has preserved them in the new outfit. So, for instance, the Highland regiments have retained the kilt, to which they clung with such great pride, only, instead of the bright-checked kilt, one of khaki is now worn.

For parade, when off duty, and on leave, all regiments will wear the former colored and more ornamental uniform until further orders. The military authorities of all the great powers have anew been led by the experiences of the South African war to more earnestly consider the question of supplying the troops with clothing and equipment more suitable for war purposes. Thorough preparation for war demands the early settlement of this question.

THE LATE SOUTH AFRICAN WAR AND ITS LESSONS.^a

By Gen. H. BONNAL.

Translated for the Second Division General Staff, U. S. Army, by Second Lieut. CHARLES M. ALLEN, Artillery Corps.

The *Revue des Deux-Mondes* of June 15, 1902, published under the heading *Lessons from the South African War*, an anonymous article which received much notice in France and other countries.

In the course of this article, written in an animated style, the author expresses various opinions, some of which are concurred in by most military men and others more or less contested.

The present article is an analysis of the article in question, which, aside from its own value, has over similar works the great advantage of containing the notes of a witness of the battles which took place on the plains of the Orange River.

Like all analyses the following article repeats the essential passages of that of the *Revue des Deux-Mondes*, followed by comments.

The article of the *Revue des Deux-Mondes* is divided into three parts:

An introduction of several pages contains a résumé of the evolution of the art of war from the time of Frederick the Great until the present time.

The first part is devoted to a description of the customs and warlike disposition of the Boers.

In the second part the author describes the operations of the English from October, 1899, to February, 1900, then gives place to an eyewitness of the operations on the veldt.

The third part contains the conclusions of the author with a view to the next European war.

^a Published by R. Chapelot & Co., No. 30 Rue de Passage Dauphin, Paris (1903).

INTRODUCTION.

Can the continental armies derive profit from the lessons of the South African war?

Assuredly, especially as to the properties, now well known, of a small-caliber rifle, using smokeless powder, and having a very flat trajectory, from which will result tactical dispositions accentuating the evolution manifest during the last century, of successive attacks and an economy of strength.

Certain military instructors deny it, and especially those who, taking for gospel the history of the Napoleonic campaigns in the science of strategy and even of tactics, obstinately wish to use with modern weapons the methods of the past.

The author refuses to certain military instructors all power of adaptation.

The reproach is no doubt merited, for there are two kinds of military instructors—those who persist in following the beaten paths, and those who, having a mind of their own, strive to develop in their students powers of observation, of judgment, and decision, so necessary to the man of war.

The true military instructor is one who gives small time to didactic teaching, but who turns most of his attention to the study of concrete examples, turning his back on gospels as well as on speculative teaching.

Thus it is that in the greater part of the grand maneuvers of Europe one still sees, after a more or less extended preparation by fire, attacks called "decisive," executed by infantry in compact masses, directed against the enemy to the accompaniment of their bands with drums beating the charge.

Decisive? Certainly. Since the 18th of August, 1870, such attacks have been so for the troops making them. Without exception they have terminated in bloody disasters.

If the methods of instruction of the large units were of a really practical character, and if the knowledge of tactics in all its branches were more fully developed, our grand maneuvers would to a certain extent have the appearance of real war.

We say "to a certain extent" because, on account of the short time given each day to the combat, properly called, the grand maneuvers can be only an outline of the operations on the field of battle.

It is in the garrisons and camps of instruction that companies, battalions, regiments, and brigades ought to be trained to act as they would in the presence of the enemy. There at least one knows from where attacks will come, while in the grand maneuvers this is impossible.

The grand maneuvers would be only trials of endurance for

the troops and exercises for the different arms of the service, but it would be necessary to keep them up.

Attacks *en masse* without sufficient preparation are to be condemned.

Under Napoleon I the rôle of an attack *en masse* was not so much to fall upon the enemy with compact bodies of troops as to push to the extreme a former success gained at the decisive point by the combined action of numerous batteries and bodies of infantry fighting as skirmishers. The attack *en masse* acted then as a reservoir, from which could be drawn the elements of fresh efforts to enlarge the breach and transform a partial success into a complete victory.

Though the attack *en masse* directed against an enemy still in the possession of the greater portion of his forces is a crime, it suffices to immortalize the general who, having prepared it, makes it succeed.

According to the author the decisive attack of the Germans on St. Privat, August 18, 1870, should have ended in a bloody disaster. It was, however, this attack, made as night was falling, which procured them the victory and in a measure decided the fate of the campaign.

The author no doubt had reference to the premature attack of the First Division of the Prussian Guard a little before 6 p. m. This attack is in fact the most striking example one can cite in favor of the necessary combination of the fire of artillery and infantry to make a breach in the enemy's line.

Under the circumstances, none of the conditions of success having been fulfilled, the disaster of the First Division of the Guard ought to have been complete, and so it was, without, however, carrying with it the flight of the troops who composed it.

But the priests of the Imperial cult do not admit changes. They extol the action *en masse* of the beginning of the century. They resolutely refuse to recognize the principle stated by the master: "An army ought to change its tactics every ten years."

The priests in question can only be, in the mind of the author, the "certain military instructors."

No more action *en masse*! It is easy to say so, but with what shall we replace all the methods known and tried by experience for subsisting, maneuvering, and fighting a million men opposed to another million men in a theater of operations relatively restricted?

The principle which the author attributes to Napoleon is inexactly stated. It should read as follows: "It is necessary to change the tactics of war every ten years if one wishes to maintain some superiority."

The expression, "the tactics of war," as used by Napoleon, had a very general meaning, applying even more to strategy, as we know the term to-day, than to tactics proper.

The author complains of the resistance to progress in the armies, especially the older ones, and, as a stimulus, calls up the specter of Jena, using, of course, the German point of view. But if the Prussians were beaten at Jena, it was because Frederick was dead and Napoleon very much alive.

Nevertheless, the power of the rifle in the hands of skirmishers was a factor to be reckoned with. Frederick did not make use of it, because in his time fire-action counted for little. The bayonet was the deciding factor.

It was not the power of the rifle, using flintlock and spherical bullets, which gave to the skirmishers of the Revolutionary armies, beginning with 1794, an overwhelming superiority over troops formed in line at close order.

The skirmishers of the Revolutionary period took position at fighting distance in front of an enemy who was stationary and formed in three ranks, the men standing shoulder to shoulder.

Under these conditions the scattered skirmishers had before them a very vulnerable target, while a majority of the enemy's shots fell in their intervals. But this was an advantage of secondary importance when compared to that which was secured by the Republican armies in the use of reserves.

In fact, the linear order required the deployment of almost the entire force in a stationary and compact line, while the use of skirmishers required a portion of the effective force varying only from one quarter to one half; hence the Republican leaders possessed strong reserves, which they knew how to throw at the proper moment against the salient points of the enemy's front or flank, whose capture carried with it the downfall of the entire line of defense.

Before the enemy's line, strong as a whole, but relatively weak at the point of attack, on which would converge the main efforts of the three arms, the skirmishers, forming curtains, removed from the fire action that character of rapid decision which it had in the time of Frederick, and thus se-

cured to the command the time necessary for maneuvers and dispositions in preparation for the decisive action.

Victory was gained then by directing against the entire line of the enemy a series of partial attacks by skirmishers and in using at the proper moment an overwhelming force against some skillfully chosen point.

To say that Frederick did not utilize fire action is to betray an imperfect knowledge of his battles. Never, perhaps, has the power of musketry fire manifested itself in so decisive a manner as in the battles of Prague, of Kollin, and of Leuthen.

An élite of officers, such as Bourcet and Thiel, professors of Bonaparte at Auxonne, prepared the tactics of the Revolution, which replaced those of Guibert and of Gribeauval.

The tactics of the Revolution sprang into being without preparation, since they were developed under the hard rule of circumstances and necessity. Who could be made to believe that the Revolutionary generals, all more or less improvised, hence lacking all military instruction, could be influenced by the researches of a Bourcet or of a Mesnil-Durand?

As to Gribeauval, we do not believe even now that he was a great tactician, his glory of having created a very homogeneous system of artillery always having appeared to us to be merely a technical one.

Another error, which is opposed by the present science of psychology, consists in thinking that Thiel could have been an instructor of Bonaparte.

Such a man as Napoleon never had an instructor. He developed wholly in himself, by direct observation and reflection on events in which he took part, and thanks to his exceptional ability to separate the important from the unimportant.

A man such as Hannibal or Napoleon makes his impress on the military science of his time and carries it to the highest degree of perfection that it can then attain. He shows by admirable examples the dispositions which are suited to the circumstances and means of his time, and nothing more. It is useless to attempt to imitate them to-day, when our instruments of war differ entirely from theirs.

Let us pass over Hannibal and the military science of his time, the term "science" supposing a degree of intellectual culture which the Carthaginian generals probably did not possess, and turn to Napoleon.

The author is persuaded that this man carried military science to its highest degree of perfection.

He, and he alone, personified the military art of his time, after having stifled the initiative of subordinates, crushed

the personality of superiors, and so completely absorbed all the functions of command that his lieutenants, as soon as they were left to themselves, after 1812, became an easy prey for opposing generals of a second order.

Could one find in France after Waterloo a trace of the military science to which Napoleon had given his imprint?

In Europe, the Prussians alone knew how to profit, after his death, by the lessons of the master, and it was through them that they were able to conduct, in the skillful manner known to all, the fruitful campaigns of 1866 and of 1870-1871.

Our present instruments of war differ from those used by Napoleon, but not absolutely. The art in time of peace consists in appreciating at their just value modifications in organization, means of transportation and communication, finally, in armament, and in applying to all the best methods for attaining the supreme object, which is victory.

The tactics of the future will depend much more on the moral condition of the nation at the beginning of the war and upon the individual energy of the soldier than upon the power of its armament.

The tactics of to-morrow, a little different from those of yesterday, will give good results if our corps of officers, composed of good material, vigorous, and enthusiastic, has been able to acquire a knowledge of the real conditions of the battlefield, and to give to the rank and file, mentally and physically, a solid military education.

The effect of rapid-fire arms and smokeless powder forced the English to totally abandon their former methods. A new system of tactics, entirely different from that now applied in most European armies, has been improvised and adopted by them.

Everyone knows that among English officers various sports are held more in honor than professional study. Intellectual standards are affected by this. And again, the English officer is too much absorbed in his outside duties to give much time to his company. Despite these unhappy conditions, the practical mind and force of character inherent in the Anglo-Saxon race must soon lead the English to discover and put in operation a system of tactics appropriate to a special kind of enemy, such as were the Boers.

The same thing took place at the beginning of the conquest of Algeria. After numerous checks, due to tactical dispositions not adapted to the special conditions of a war in an Arabian country, the French generals, and first of all Marshal

Bugeaud, chose the special mode of action necessary in order to conquer, and their success was constant thereafter.

But in 1870, when our generals, educated in the school of the Algerian campaigns, were opposed to German troops, they could not, lacking sufficient preparation, modify the methods dear to them, and their professional inferiority became flagrant when compared to adversaries who had cultivated industriously the traditions of the great wars, and had taken into account the material progress which had taken place in all branches of human activity.

The author takes a stand against the criticisms addressed during the South African war against the English commanders and their troops. His principal argument in favor of the English army consists in saying that the officers were prodigal of their blood and that the troops of 1899-1900 were excellent.

In August, 1870, the French officers and men showed a bravery of the highest character, and yet the French army of this time could not conquer on any single day, even when through favorable circumstances it was opposed to inferior numbers, as at Spicheren, Borny, and Mars-la-Tour.

The criticisms of the English generals and troops accentuate, not their lack of bravery, but their tactical impotency.

Until the arrival of Lord Roberts in South Africa the English made use of the pure linear system of tactics, like the French in 1870, and like them had to suffer the unhappy consequences.

PART FIRST.

The ten pages devoted by the author to the character, customs, and manner of fighting of the Boers contain a full résumé of all that has been said or written of this unique people.

The Boer is in the full sense of the term a "mounted infantryman," who understands perfectly how to make use of both his horse and his rifle.

In partisan warfare the Boers showed themselves incomparable, but throughout the operations at the close of the war they could only defend positions naturally very strong, without ever making a counter attack, even when their superiority of fire had, to a certain extent, put the enemy at their mercy.

Again, the Boers—individualists in the extreme, without discipline, and lacking all power to maneuver—could never hold out against an enveloping attack, which was for them always the signal for a disorderly retreat.

PART SECOND.

The author states that in 1899 there took place at the camp of instruction on Salisbury Plain maneuvers which preceded by a few days only, the departure for South Africa of some of the troops taking part.

It can be stated here that their methods of fighting were very nearly those of a majority of European armies, more particularly, perhaps, with regard to the cavalry and artillery.

There can be no doubt that the author wrote the preceding lines in good faith, but the foreign attachés who saw the English maneuvers shortly before the South African war reported an impression less favorable.

Moreover, General Sir Redvers Buller, who directed the maneuvers of 1899, shortly before his departure for South Africa, did not show himself to be very optimistic, and his criticisms emphasized the lack of tactical instruction of the English troops.

This officer called attention to the insufficient preparation of attack, the massing of troops, absence of unity of action, and the ignorance reigning in each arm of the service on the subject of the tactics of its sister branches.

General Buller said of the English cavalry and infantry, "that they know where they ought to go, but they are ignorant of what they have to do when they get there."

In other words, the English troops know how to form according to regulations, but they can not adapt themselves to the varying circumstances of the action.

Their tactical impotency can not be stated in polite terms in a clearer way.

After praising the maneuvering ability of the English army the author leads the reader to the battle of Talana Hill, October 20, 1899:

General Symons, commanding 4 battalions of infantry, 1 regiment of cavalry, and a body of Natal police, about 4,500 men in all, had established his camp to the west of and near the little village of Dundee. At 4,500 meters, a cannon shot to the northeast, there lies a line of heights, Talana Hill, Impati-Mount, etc., from which the town is separated by a moderately deep valley.

General Symons covered himself toward the enemy by a line of advance posts placed on these heights.

The troops in camp, thus covered to a distance of about 5 kilometers, believed themselves safe. They did not take into account the fact that one line of advance posts, however well placed, is always surprised when it is attacked, in its supposed positions of safety. It was for this reason that Marshal Bugeaud organized his system of outposts which allowed the line of advance posts to be transformed in a short time into a line of battle.

On the other hand, we read in the excellent and very complete history of the South African war compiled under the direction of the Second Division of the General Staff:

Although commanding the English camp at about 4,000 meters these heights (Talana Hill, Impati-Mount) had not been occupied on the night of the 19-20 October except by a small post of mounted infantry.

This, then, is what the line of advance posts, placed on the heights which commanded the English camp at 4,000 meters resolves itself into.

The comments of the author on the so-called placing of a line of advance posts on the heights to the east of the English camp lose at once all instructive value and are stricken out bodily.

Besides, these comments express a false idea; for advance posts, properly placed, intelligently connected, with the several elements properly performing their duties, can not be surprised.

What shall we think of the Bugeaud system of outposts, which permitted the line of advance posts to be transformed in a few minutes into a line of battle?

The author would probably not have written this sentence if he had looked up the chapter in the works of Bugeaud which treats of the service of security at night of a completely isolated detachment.^a

Let us return to the battle of Talana Hill.

The commandos under the orders of Gen. Lucas Mayer occupied the heights of Talana Hill at 3:30 a. m., drove back the little advance post, and opened fire with their 5 guns, about 5 a. m., on the English camp.

Surprise, disorder, then formation of troops in good order and return fire by the English artillery till 7:30 a. m.

Three English battalions then move in battle formation directly against the Boers occupying Talana Hill, and toward

^a "Military Works of Marshal Bugeaud," collected and arranged by Weil, former captain of cavalry, p. 98, Librairie Baudoin, 1883.

1 p. m., after various efforts, dislodge the enemy from his position.

During the action a squadron of English hussars, sent alone to act against the enemy's rear, was surrounded and captured.

The English losses were 10 officers and 31 men killed, 20 officers and 165 men wounded, and 9 officers and 211 men taken prisoners.

The author of the article of the *Revue des Deux Mondes* says of this battle:

The action commenced and was carried out in the regulation manner.

Who has ever seen a regulation, even an English one, which required the bull to be taken by the horns?

The regulations prescribe formations, from which the commander makes his choice and then modifies to suit the circumstances; but there are not and can not be tactical regulations.

However, our regulations of May 28, 1895, on troops in campaign give under the heading of the combat, certain advice which General Symons would have done well to follow, and mentions the following points to be distinguished in every action of an isolated force: The preparation, or attack on the enemy's entire line, and the decision obtained by a violent effort concentrated on some well chosen point and, finally, success.

The history of the Second Division, General Staff, brings out this point in a forcible manner when it states:

The heavy losses of the English infantry during its advance without cover should not come as a surprise, knowing the effect of modern armament. They show the advantage to be gained by maneuvering, instead of making a frontal attack. Guided and covered by an advance guard action, General Symons might have been able to dislodge the enemy by maneuvering against his flanks.

On the Boer side a minimum loss, but complete passivity with a very skillful employment of their fire.

The author takes care not to describe the battle of Elands-laagte which took place the next day, October 21, and in which General French by combining an advance guard action with an enveloping movement, was very successful in beating down the resistance of a detachment of Boers under General Koch.

This battle contradicts the reasoning which the author seeks to establish, through a preconceived idea, that the tactical methods of the English underwent a continuous transforma-

tion, under the influence of events, from the beginning of the campaign to the taking of Bloemfontein.

The article of the *Revue des Deux Mondes* then gives a very succinct résumé of the battles of December, 1899, and January, 1900, all more or less unfavorable to the English arms.

According to the author:

The English threw themselves on the enemy without having defined his position by reconnaissance. They employed deep formations, using successive lines, which received all the bullets sent by the enemy.

What is this reconnoitering action the regrettable absence of which is pointed out, if not the "advance guard action," a term disliked so much by the author?

According to him it was only on January 20, 1900, at the battle of Venter's-Spruit that the change of tactics he delineates brought it about that on this day the two battalions at at the head of the Woodgate Brigade:

Formed in long, thin lines and advanced by rushes. They arrive at the plateau, which is approached by a glacis of about 900 meters, and try to ascend. But here, after considerable losses, they are stranded. These troops do not yet know how to carry through an attack.

Lord Roberts will show another way. The evolution of tactics is accomplished. Its theater of operations will be the Orange Free State.

Thus, on January 20, 1900, the English troops were ignorant of the proper means of succeeding in an attack, but one month later their change of tactics was completed, thanks to Lord Roberts, and this change was particularly remarkable, in that henceforth every action with the Boers ended in victory for the English.

One can believe this easily when one knows that the troops of Lord Roberts, eight or ten times more numerous than those opposed to them, acted after the fashion of an army of game hunters.

On February 18, General Cronje, not having retired soon enough or quickly enough towards the east with his 4,500 Boers, was surrounded near Paardeburg Drift, on the Modder River, by the divisions of Lord Roberts.

The investment of the Boer camp was completed at noon. The English should have confined themselves on this day to a general and methodical tightening of their lines; but their division commanders, breaking away from superior authority, thought they were doing well in pushing their attacks home,

each on his own account, at what appeared to him to be the most favorable moment. These partial attacks withered under the Boer fire and caused considerable losses without the least profit.

We see in this, as in other cases, that the English generals, as well as their troops, knew but one method of fighting, the decisive attack.

This bloody affair of February 18 is the last in which the English sought to force a position by employing the old methods.

The author would have better said *their* old methods, for in other European armies the "decisive attack" was not, as with the English, the Alpha and Omega of tactics.

After the capitulation of Cronje (February 27, 1900), the investing troops, strength about 45,000 men, of whom 12,000 were mounted, with a strong force of artillery, took up their march across the veldt under the skillful direction of Lord Roberts, and adopted a method of approach well suited to the circumstances.

The 4,000 or 5,000 Boers whom they could possibly meet in position on the kopjes scattered over the plain, knew how to use fire action only, to the exclusion of all maneuvers.

Besides, it was advantageous to move deployed on a large front, so much the more as the movement was directed on Bloemfontein, capital of the Orange Free State, and it was therefore certain that the Boers would interpose themselves between this town and the invading force.

According to the author, the front covered was often over 20 kilometers.

The army corps advanced in line of brigades, and each of these (8 in number) covered a front of 2 to 3 kilometers, counting intervals, and an equal depth.

To change from the marching formation to that of attack, it sufficed to increase the intervals between the different elements.

The advance guard was formed of mounted troops, with light artillery.

According to the author, the four battalions composing the English infantry brigade formed a sort of open double column, each battalion having its eight companies in column at 100 meters distance, and in each company the men in one rank with three or four paces interval. Each brigade column was so formed as to be numerically superior to any enemy it could meet.

At ten to one this condition was easy to obtain.

The author also says that on such a large front (20 kilometers or more) the columns meeting the enemy in position stopped and opened fire at long range, while those not finding an enemy in their front continued to advance and then closed in on the enemy's rear.

We could have deduced this fact ourselves.

The means employed by Lord Roberts to dislodge the enemy during the march on Bloemfontein, and later on Pretoria, were ingenious and perfectly adapted to the requirements of the situation. One can but praise this general for having cast away the forms of war in use in European armies and adopting in their place others inspired by the nature of the country and the tactics of the Boers.

NOTES OF AN EYEWITNESS.

The author of the article in the *Revue des Deux Mondes* borrowed extensively from the personal notes of an officer whom he designates by the modest title of "Eyewitness."

These extracts are of great interest, because they describe with a strong tone of sincerity the events personally seen.

During the march from Paardeburg on Bloemfontein General French commanded the advance guard, consisting of 1 division (3 brigades) of cavalry, 1 division (2 brigades) of mounted infantry, 7 batteries of horse artillery, and several sections of machine guns.

This advance guard, more or less divided, preceded the army by 15 to 20 kilometers. It is this, and this alone, that is referred to in the following lines:

Generally the task of making the frontal attack fell to the mounted infantry. It dismounted under cover at about 2,000 meters, and leaving the horses here formed lines of skirmishers and tried to take advantage of cover.

The assailants could not, in general, advance to within less than 800 meters, at which distance the enemy's fire became extremely effective, due to absence of smoke and the denuded character of the country.

It seemed that at about 800 meters there was a barrier almost insurmountable.

In an open country every rifle has a distance called that of "effective fire," which depends on the curve of its trajectory.

This distance with the 18 mm. gun, spherical bullet, was from 150 to 200 meters.

It reached 300 meters with the same gun, when rifled and using truncated projectiles expanded by a hollow in their rear surface.

In 1870 the range of effective fire varied from 350 to 450 meters, and it would have been 500 meters if the Germans had not had a greater interest in approaching to 400 meters on account of their weapon (the *dreyse*) having a trajectory much more curved than that of the French *chassepot*.

If this war had been fought with the rifle model 1874, using metallic cartridges, the range of effective fire would have been 600 meters.

With the rifle now in use in most armies the range of effective fire should be from 700 to 800 meters, and the experience of the South African war goes to confirm this theoretical deduction, which is sustained, besides, by firing on the range.

It is at this range that one can reasonably hope to obtain and hold a superiority of fire, when this is considered necessary.

It goes without saying that the effectiveness of fire increases from 700 or 800 meters as the distance grows smaller, and this distance is considered the closest to which a body of skirmishers, sheltered or lying down, can push an attack under truly effective fire without exposing themselves to ruin.

Save in the case of obstacles or cover assisting the advance in the zone under 800 meters, infantry skirmishers could not then advance in this zone unless the fire of the enemy was more or less checked by opposing artillery or infantry, or by the combined fire of both these arms.

The formation adopted to advance through the zone 2000-800 meters was in one rank at 3 or 4 paces interval, without supports or reserves. Everybody was in line. Besides, it was not sought on this portion of the field to produce a violent effect. They counted on the action of the wings, the effect of the artillery, finally on the arrival of the main body. They sought, above all, to gain time, and often the close of the day closed the attack before they had reached the threshold of the 800-meter zone.

The mounted troops under General French were divided into three parts—the center, very much scattered with a view to the advance-guard action, destined to reconnoiter and find the limits of the enemy's position; the wings, concentrated out of sight of the enemy for the purpose of acting against his flanks, once these had been found by that portion of the advance guard acting against his front.

This was a judicious disposition, provided that the advance guard as a whole was numerically superior to the enemy, and that the enemy always remained chained to his position.

Against a stationary enemy anything could be dared save premature frontal attacks.

The advance was made by rushes from one shelter to another. Open ground was shunned, not only when stationary, but also when advancing.

The battles of the war of 1870-71 show on the German side methods of approach identical with those here described.

The advance was made by groups more or less strong from cover to cover, excluding all formality, the end to be attained dictating the means to be employed.

Almost all the officers got into the habit of sending forward to the next cover non-commissioned officers or good men, while they themselves superintended the movements of their command. The contagion of example has always been a resort more powerful for moving men forward than an impulse from the rear.

This practice is not a new one. It was in use for some time, and no doubt continues to be used in one of our army corps that we could mention, with the difference that here the chiefs of section move forward themselves to the next cover and then signal their men to join them.

The English method seems preferable because it allows the officer to watch the laggards, always the same.

The line of skirmishers, as formed in the beginning, did not hesitate to change form under the influence of the cover. The cover ruled the intervals and fixed the form of the line of battle.

The influence of cover has been described also by officers of infantry, both French and German, in all the battles of 1870-71.

The contact action now holds the enemy in front. The action of the artillery occupies his wings. The enemy does not move. The enveloping movement will occupy a considerable extent of time.

This contact action is nothing but the advance-guard action as we know it, and in this case simple mixed patrols would have sufficed, since the enemy really held himself.

The action of the horse artillery on the two wings was due to the fact that the batteries were systematically divided between the two groups of cavalry or mounted infantry formed behind the wings of the central group charged with the execution of the frontal attack.

When this action appeared ripe the flank groups, moving by platoons, marched under cover until opposite the enemy's flanks, reunited, dismounted, and formed tactical units, which took position on the flanks to open a musketry fire.

At this moment the day generally came to a close and the Boers, seeing themselves flanked, commenced to beat a retreat.

The pursuit was confined to a few shells fired at the convoy. During this time the frontal attack (advance-guard action against the front) had regulated its advance on the retirement of the enemy, in place of precipitating their retreat by a decided offensive action.

*

*

*

*

*

*

*

As an excuse for this slowness in pursuit there has been brought forward the state of fatigue of men and horses on the approach of night. In reality it was due to nervous exhaustion. The nervous tension caused by danger produces such physical fatigue that some men who have not moved all day, but who have been subjected for long hours to a fusillade, are incapable of any effort. With modern arms this tension is greater than formerly, and the resulting depression is also greater.

It is fully conceded that the English troops employed in the frontal attack, long submitted to an effective rifle fire, should have been too much fatigued to have thrown themselves on the enemy in retreat; but the other troops, detached on the flanks, and whose action had been as short as it was recent, why should they not have pursued the enemy?

It was because, having left their horses far in rear, the flank troops were incapable of all rapid movement.

This statement is sufficient to condemn the method which required the whole strength of cavalry to dismount, even when, due to peculiar circumstances, its principal function was fire action.

We come now to the phenomenon of nervous exhaustion in the case of the mounted infantry engaged in the frontal attack, who were exposed for several hours to a fire at distances around 800 meters.

This state of the nerves is well known, and officers who took part in the battles of the Franco-Prussian war remember having observed in their men, when they were heavily engaged at the range of effective fire of the time (about 400 meters), a mental and physical depression, increasing with the length of the action.

In such circumstances the soldier is as if chained to the ground, and if he fires at all it is due to the instinct of self-preservation, which incites him to kill to avoid being killed.

The South African war teaches us nothing in particular on this subject, but it shows that the range of effective fire has reached the point of 800 meters to-day in place of 400 meters as it was in 1870.

This statement of the doubling of the range of effective fire permits us to say that attacks insufficiently prepared and whose objectives have been unskillfully chosen will give rise to shambles more bloody and not less useless than formerly.

The art of superior command will be more delicate and more difficult certainly.

But does one not see in all branches of human activity the perfection of tools demanding more skillful workmen?

If the modern law of division of labor results in developing to the extreme in the artisan the power of thought necessary for the execution of his task, it requires much more skill to properly direct an industrial, agricultural, or commercial establishment, and still more to properly command a large unit of the three arms called to fight not only against material difficulties, but most of all against an enemy provided with the most effective means of action.

The phenomena of psycho-physical depression, already noted in 1870-71 and in 1877-78 among skirmishers fighting at the range of effective fire, can not fail to be accentuated in the future with a reduction in the length of active service and on account of the absence of smoke, which renders objectives almost invisible and often causes bullets to fall apparently from space.

This highly important fact acts in favor of progressive and sparing action of the infantry units in the first line.

We will be led, we think, to withdraw from the action some units which have been subjected to a heavy fire when they can be replaced by fresh units.^a

Infantry engaged for several hours will, in fact, have lost all combative power, and will be only a demoralizing element for the reenforcements which come to them.

It must be said, in conclusion, that in order to continue a frontal attack all day, or perhaps even for several consecutive days, the echelon of troops from front to rear, otherwise called the perpendicular order, is more necessary than ever, and is opposed to the extension of front, which seems at first sight to be required by the perfection of our weapons.

This action of the mounted troops forming numerous advance guards often sufficed to open the way for the infantry divisions; but it often happened that it did not bring the required result, either because the enemy held his ground too well or because the line of defense was of too great an extent.

The eyewitness from whom the preceding lines are taken does not hesitate to employ the term "advance guard" for designating the light troops charged with reconnoitering the enemy, holding him in front, and even sometimes maneuvering against his flanks.

^aThis was done in several cases in the war of 1870, notably with the Prussian Eighth Corps August 18 at the farm of Saint-Hubert, and on the eastern border of the valley of the Mance.

The author himself has for the words "advance guard" an extreme dislike, for which we are unable to account.

The notes of the eyewitness then describe the deployment of the army, preceded by oblique movements of the wing columns, the going into action of the artillery, the march of approach, the entrance into the zone of artillery fire (between 4,000 and 3,000 meters), and lastly the arrival at 2,000 meters from the enemy.

At this distance the wounded could still be gathered and removed, and mounted officers could remain with their commands.

At about 1,500 meters the attacking party opened fire. The fire was at will, lying, using the magazine. In order to move as little as possible, the men learned to load while lying face down.

The opening of fire marked a slackening in the progress of the attack. As soon as the advance was resumed, anything became a pretext for halting and firing again—officers or men wounded, favorable shelter, halting of neighboring companies, etc.

Let us not forget that we are on the veldt, an immense prairie, broken at intervals by ranges of kopjes.

Despite this unfavorable condition for the approach, we can not praise the English infantry for having opened fire at 1,500 meters from the enemy.

To-day, as in the time of Marshal Bugeaud, "to open a long-range fire is the act of poor infantry."

To open fire at long range it is necessary to fire at a distance much greater than the range of effective fire, which from 200 meters in 1860 increased, at least in France, to 400 meters in 1867, to 600 meters in 1874, and to 800 meters in 1886.

In each battalion the necessity of taking part in the fire and not continuing to submit to losses without attempting to inflict some in return, brought on the firing line the companies in rear. Thus the columns deployed without special orders to do so. The arrival of a fresh company did not cause a forward movement, because the newcomers, impelled to seek shelter and open fire, stopped at the same obstacles which held the first line.

The same phenomena were observed in 1870-71 with the Germans on the offensive.

At this time, already far in the past, the companies in reserve, when they could not obtain shelter and found themselves exposed to fire directed at the first line, had a strong tendency to join the firing line and take part in the fire.

The arrival of a fresh company on the firing line sometimes caused an advance movement, but not always; and, in our opinion, our Regulations of 1875 and 1884 should not have required absolutely that every reinforcement of the firing line should be the signal for another rush forward.

To return to the English. The frequent halts of their firing line between 1,500 and 1,000 meters did not give evidence of a very strong offensive spirit. What would have happened if the Boers could have made use of numerous rapid-fire guns?

To go to the bottom of the matter, the English soldiers were not animated by a true fighting spirit, but fought merely as a professional duty, seeking above all to preserve their precious existence. In each battle the losses among the officers, out of all proportion to those of their men, showed likewise that the soldiers lacked keenness.

The four rear companies of each battalion were held 500 meters in rear. They formed line deployed in one rank, occupying a front equal to that of the firing line.

The English battalion being composed of eight companies of about 100 men each, its firing line of four companies in one rank should have measured from 300 to 400 meters.

In all formations of approach or combat it was merely a question of subdivisions marching by the flank or in Indian file. This fact is well to remember.

The reserves were held at 1,500 or 2,000 meters from these companies; the battalions composing them kept their marching formation in column of companies deployed in one rank with intervals. But the distance between companies changed unceasingly, giving the impression of an accordeon, regulated by the accidents of the ground. In directing their fire (artillery) on this formation, the enemy's gunners ought to have been disconcerted by the instability of the target, rendered still more difficult of definition by the khaki uniforms, blending exactly with the color of the veldt.

This open-woven human carpet presented throughout its extent an equally slight vulnerability. No part attracted special attention, and the division of the objective, reduced to the state of human powder, caused a dispersion and reduced the effect of the enemy's fire.

We must not forget the special conditions under which the English made their march across the veldt.

In the first place the enemy was ten times less in number than the invading force. In the second place its action was one of purely passive defense, without any maneuvers whatever. Finally, its artillery was reduced to a few guns, scattered singly over a large area.

To be sure, Lord Roberts solved the problem by diminishing his losses to a minimum, but he did so at the price of breaking all the bounds of tactics and scattering his men to the point of reducing them to "human powder."

It is told that at the brigade maneuvers commanded by the German Emperor, the 29th of May last, on the field of Tempelhof, there was an occurrence that does not lack interest.

The advance guard battalion had taken the approach formation, called by antithesis *Boersturm*, which consists in placing the four companies deployed as skirmishers, one behind the other, at 100 or 150 meters distance.

It is really the formation of the English on the veldt.

Everything was going well, when, in the course of the march of approach, the battalion was attacked in flank by several squadrons debouching by surprise from a fold of the terrain.

The cavalry rode freely through the spaces between companies, and it was decided that they had received in all one dozen bullets. In reality, they would have overturned the rows of skirmishers like rows of cards.

On this occasion, if William II wished to give the officers of his guard a good practical lesson, he completely succeeded. This shows besides that our neighbors in the east have an eye open to the tactical methods in use abroad, even when they are of a very special character, and that they do not hesitate to put them into practice, discarding them if they do not satisfy the conditions of war in Europe. More important occurrences took place at Döberitz; they will be discussed later.

If the second line sought safety in its formation, the first line sought it above all in the terrain. The cover took all symmetry from the line, ruled the intervals between groups, and the density of the skirmishers. Squads, sections, entire companies, gathered behind them, according to their size. They had an irresistible attraction for the men.

The use of cover was greatly developed in the actions and battles of 1870-71, as shown in the numerous French and German monographs published immediately after the war.

Once the action was started, one could see nothing but flashes and a little smoke, because the skirmishers on both sides were hidden behind cover or lying flat.

The fighting lines were not visible except during a partial or general attacking movement. It is evident that the use of cover on the firing line will have a greater importance in the future as cannon and rifles become more powerful.

This formation (of attack) was continued up to a zone which by an instinctive empirism, founded on certain indications, was estimated at about 1,000 or 800 meters from the enemy.

These indications, which, lacking a visible enemy, guided in the estimation of this distance, were the following:

Every collective movement on the firing line caused the enemy's fire to be redoubled.

The Mauser rifle, 7 mm., using a clip, with which the Boers were provided, is an extremely powerful weapon, which per-

mits an overwhelmingly effective fire being obtained at a distance of 1,000 to 800 meters against a target very much restricted; but the acute vision of the Boers was a highly important factor, and it can be believed that European riflemen could not have done as well.

One can conceive that the rifle could be perfected to such a degree that at the distance of a thousand meters, for example, it would permit a fire against a little group of three or four men lying down, with the same probability of hitting as to-day at 400 meters with the rifle in service; but could a European rifleman, taken from an agricultural village or industrial town, see such a small object at 1,000 meters?

At 800 meters commenced the last act of the battle. The groups which had in front of them an open country halted, submitted to the enemy's fire, and watched what took place on their flanks. * * * On the contrary, those who could obtain broken country or one affording cover, continued to advance. The advance in the zone under 800 meters is the hardest problem to be solved. From the moment of beginning the action in this zone the cover favored the different groups unequally. Some would find themselves unexpectedly close to the enemy, while others were still far off. The firing line then took on sinuosities, which put it at the same time at 400, 600, 800, 500 meters * * * from the line of defense.

This is the way the offensive action against the enemy's front should be conducted: A continuous advance of the elements of the first line to the limit of cover nearest the enemy, for the purpose of holding him, demoralizing him by inflicting loss, and thus preparing for the action of fresh troops charged with breaking down his resistance at some chosen point.

The idea of a frontal attack has become familiar to most officers, thanks to the works of certain writers (not to offend the author of the article in the *Revue des Deux Mondes*); in this case they had the most happy results.

This kind of fighting excludes all formality; the important thing is to place guns to saturation behind every bit of cover afforded by the terrain, leaving the open spaces empty or at most occupying them with small parties, held at least 800 meters from the enemy.

The various officers who have taken part in these approaching actions affirm that their direction is absolutely lost to the generals and superior officers. Their direction rests on the initiative of inferior officers and soldiers, accidentally guided by the signals or example of subalterns.

This was a fact even in the battles of 1870, and if the "eye-witness" author of the notes we are analyzing thought he was bringing forward something new he was mistaken.

The rôle of generals and superior officers is not to direct the

action of skirmishers properly speaking; this is the work of captains and lieutenants.

A body of infantry in action loses all higher direction, and is incapable of any maneuver save advance or retreat.

On the other hand, this body becomes enfeebled, *consumes itself* very rapidly, and its power of action would very soon become nil if measures were not taken to reenforce it by means of fresh troops coming as it were to infuse new blood in its veins.

This is where the higher officers as well as the generals intervene for the proper use of supports and reserves.

Their intervention in an action of skirmishers is limited to "nourishing," and yet in this way they exercise considerable influence over the results of the action.

In this violent action each man carries his life in his hand, and applies himself chiefly to taking cover. He does not fire except when under cover. When he is near enough to the enemy to catch a glimpse of him during the brief moment of a rush at full speed, he gives little thought either to his officers or to his neighbors. He does not desire any reenforcement, which will cause an increase in the enemy's fire. The quality of his cover is of more importance than anything else; it renders the man stationary, but renders him also less accessible to the impressions which might cause him to beat a retreat. In fact, he is conscious that whether he leaves his cover to advance or retire, the danger will be the same. This sticking to cover, especially at short ranges, was a constant factor with which commanders had to reckon.

The perfect egoism of the English soldier, which is a characteristic of his race, accords well with the foregoing lines.

Certainly the English soldier has shown in this war, as he did in those of a century ago in Spain, great bravery, allied with much sang-froid and tenacity. But he is above all an individualist, and this quality, excellent in commerce, is not so good in war, which requires great self-abnegation.

The Russian motto, "Perish, but save your brothers," will never be agreed to, much less put in practice, by the English.

The French skirmisher would be happy over the arrival of reenforcements, even if this provoked an increase in the enemy's fire, for in this he would see a sign of success.

The English soldier takes the unique view that any reenforcement will cause him to run into greater danger.

In the different frontal actions it was always the initiative of certain groups of skirmishers that brought success.

In any case it was not brought by a push from the rear.

On the veldt the Boers, numbering 10,000 to 12,000, defended, successively, lines of kopjes often 20 kilometers in extent.

It is not surprising, then, that certain English groups should have been able to force the enemy's line at some point or other, and by either irruption in the position cause the retreat of groups near the positions taken—a retreat which gained by degrees the entire line of defense.

The success in the frontal attack having been gained by the skirmishers alone, independently of the superior commanders, who had not seen, much less pointed out, the points to be attacked, the impulses coming from the rear could not have gained the victory.

The situation would be entirely different in a battle with well-organized European troops. Here, partial successes by a few groups of skirmishers would have no effect on the whole, and in order to win it would be necessary, as in the past, to make a very energetic and well-sustained attack on the enemy's entire line and to combine frontal attacks with one or more attacks on the section chosen by the superior commander; attacks operating by surprise, and provided with means greatly superior to those with which the enemy could oppose them.

It often happened that the intervention of troops, up to that time more or less out of action, appearing unexpectedly on the field, decided the fate of the day.

The flanks of the enemy served as an objective and might thus find themselves between two fires.

The surprise attack on the enemy's flank is one of the most favorable conditions of success. The English had recourse to it as often as they were able. It was not difficult for them on account of their enormous numerical superiority.

The irruption was made often on an entirely different point, as the flank. It was of the greatest importance that the troops should be able to advance under cover from fire, preserving intact their enthusiasm and force of action.

That which determined the direction of their march and their objective was not any peculiarity of the line of defense, but simply the direction and locality of the mouth of the topographical depression which had favored their approach. Thus the issue of the battle was often the result of an incident of the action in place of being brought about by a series of converging efforts and increasing energy directed by the superior commander.

The essential condition of all decisive attacks is that the troops charged with their execution arrive in full possession of their powers at a short distance from the point to be taken, which causes us to say again that these troops, already covered by the frontal action, ought to find in the terrain particularly favorable facilities of approach.

If we have followed the sense of the above text, the English troops in the second line, finding in their advance a covered

way, went into it as water runs into a river and followed its windings to its end, a short distance from the enemy, and from here made a surprise attack on the nearest part of the enemy's line.

The celebrated riding master Baucher often repeated, "Spurs are like a razor in the hands of a monkey," and advised mediocre riders to remove their spurs before mounting a horse.

Generals who do not know how to organize, prepare, and then to launch a decisive attack at the proper moment and in the proper direction ought to have the sense to renounce this very perilous mode of action. This was what was done by the English generals during the second phase of the campaign.

After having totally ignored in the first part of the war the advantages of an attack such as we have described, and having brought on themselves grave misfortunes by their headstrong attacks made without judgment, the same generals later abandoned the reins to their troops and contented themselves with assisting at long range in a soldier's fight.

Against the Boers, fighting one to ten, such errors could not bring serious consequences to the English, and they had the advantage of limiting their losses to a minimum, but it is not necessary to make regulations for applying such simple methods to European battlefields.

Everyone knows what such practices lead to when the enemy is well organized, instructed, and commanded.

The combination of a frontal attack with an attack on the flank, or a sudden irruption on some other point, should not be considered as sure to bring success to the offensive. It has been remarked, in fact, that as soon as the enemy can turn to face these new attacks they are transformed into frontal attacks, and soon find themselves paralyzed.

That is a truth as old as the art of war.

A flank attack or a central attack has no chance to succeed unless one or both of the following conditions are fulfilled:

1. An attack by surprise, barring the intervention at an opportune time of the enemy's reserves.

2. The use of very superior means, artillery, infantry, sometimes even cavalry, against the point of attack; means such that the enemy shall be powerless to reestablish an equilibrium at this point.

PART THIRD.

As we have commented on the extracts from the notes of the "eyewitness," we will not analyze the conclusions drawn from the same by the article in the *Revue des Deux Mondes*.

We shall, however, examine a few of his conclusions.

The author, taking his desire for a fact, attributes to a majority of the English officers a flow of ideas which led them to change from bottom to top the tactics now in use in European armies.

We do not believe that the greater part of the English officers were capable of reasoning on a question so deep, since their military education has until very lately been to a great extent neglected.

Let us examine a few of the principal reforms extolled by the author.

The action of masses, in use at the beginning of the nineteenth century and now held in honor in the greater part of the armies of Europe, is going to find itself replaced by the action of screens and the combined action of numerous mixed columns.

We must suppose that the author was unlucky in his choice of expressions, and that his meaning was that the action of masses will be replaced by the action of screens obtained by means of the combined operations of numerous mixed columns.

In other words, the author seems to wish to divide the large advance guards of former times into a large number of small mixed advance guards, destined to act against the entire extent of the enemy's line.

Thus restricted, the author's views would not be excessive and would only show a tendency justified to a certain extent by the power of the present armament.

But if masses give place to advance guards (or screens), during the period of the frontal attack, as they have done for a century in well-commanded armies, their action will not be the less indispensable in deciding the issue.

Premature generalization belongs to superficial minds, and to manufacture hard and fast rules for European warfare from the experiences of the South African war would be to apply to everything, great and small, the treatment required by some particular case.

The power of the rifle and the invisibility of the enemy render the enemy's front difficult to take by assault.

During the war of 1870-71 such frontal attacks were always repulsed by fire, with heavy loss to the assailant.

It is sufficient to recall the following repulses:

(a) On the morning of August 6, 1870, at the battle of Worth, the advance guards of the Second Bavarian Corps, Fifth and Eleventh Prussian Corps.

(b) On August 16. at 4.30 p. m., the Thirty-eighth Prussian Infantry Brigade.

(c) On August 18, the Seventh, Eighth, and Ninth Corps of the Prussian Guard during their attempts to break the line of defense.

(d) On January 13 and 14, 1871, during the numerous French attacks on the defense of the Lisaine.

To-day, much more than formerly, the enemy's line should be approached with every precaution, allowing all the time necessary, and proceeding more by a galling fire pushed forward more and more, than by the use of great force.

Victory should be sought in a combination of fire-action on the enemy's front and flanks.

Musketry fire has never sufficed to cause the retreat of brave troops when they were well commanded.

To force the enemy to evacuate his position, it is above all necessary that the attacking infantry should approach to assaulting distance. At this moment the enemy sees himself, under pain of a hand-to-hand encounter, obliged to leave his cover long enough to fire; it is then that the artillery crushes the defense by its *rafales* killing, wounding, or dispersing him, and thus opening the way for its infantry. The enveloping maneuver hastens the decision of the action, since its effect is to take the enemy's flank between two fires. This fact is as old as war itself.

The author then considers the case in which the defender, foreseeing the envelopment which menaces him, sends his troops to meet those of the assailant. The latter, not finding an uncovered flank, are obliged to make a frontal attack on the line improvised by the defense and, as the author says, "are driven to seek a decision in a frontal attack."

In this frontal attack, numerical superiority is no longer a decisive factor. This factor rests mainly on approaching movements, carefully defiladed, and protected by the combined fire of artillery and infantry.

Hence, when the attacking party must depend on its own fire, the individual bravery of the soldier, who exercises initiative and courage freely and without possible control, becomes the factor of success.

Hence, more choice of the principal point of attack; more previous maneuvers to unite at the chosen point the troops of the three arms, designated to strike the decisive blow; more complete preparation of the attack; more nothing but soldiers who exercise freely their initiative and courage. But we are promised the "*Golden age of generals*." Our infantry did not fight otherwise at Alma, at Inkerman, at Magenta, at Solferino, and it was victorious. Unfortunately, events took on another color when the affair occurred with the Prussians in 1870.

At this time the bravery and initiative of the French soldier no longer sufficed, and in our army we were forced to believe that the commanders of all grades, when strong leaders, exercised a preponderant influence over the results of a battle.

After this war our corps of officers set to work with the hope of equaling, if not surpassing, its ancient adversaries; and thanks to its sustained efforts its progress has been patent even to the dullest. To-day, on the pretext that the second part of the South African war caused the adoption by the English of certain methods of fighting adapted to the exceptional conditions of battle, some wish to revolutionize our methods instead of perfecting them by evolution wisely conducted; they seem not to see that in acting thus they risk confusing the mind and causing a halt in the movement which has operated for fifteen years in favor of unity of doctrine.

Very happily nothing can prevail against common sense, and it will be with the theories of the author as with all purely theoretical products—the military organization will positively refuse to assimilate them, as it has always done.

The cavalry still remains the arm for rapid enveloping movements, pursuits, and the rear guard.

The author uses the term "rear guard," while he has a horror of the term "advance guard." Could it be that he found difficulty in obtaining the opposite of the word "screen" (rideau), which he affects so much?

Its importance has been increased, but its mode of action has been completely changed. The time of great charges has passed. It was so already in 1870. Those made at this time on both the French and German sides resulted in nothing but useless hecatombs.

On the contrary, we think that the wars of the future will see great cavalry charges, even against infantry or artillery, and that the result of these charges will depend almost entirely on the bravery of the chiefs who command them.

In every battle one sees troops grow weak at some stage of the action. If at such a time a mass of cavalry could strike like a bird of prey infantry or artillery more or less demoralized or lacking ammunition, it would gather laurels without exposing itself to great danger.

What would have become of the infantry of the French Second Corps on August 16, 1870, when, after the loss of Vionville and Flavigny, it was forced by the German artillery fire to flee in disorder, if the German Sixth Division of Cavalry had found itself where it should have been and had charged at the proper time on the fugitives?

The Germans recognized the failings of their cavalry generals in 1870, and have made the greatest efforts for a long time to develop in their higher officers and generals the very rare qualities of a cavalry leader.

Even in 1870, despite the statement of the author, certain cavalry charges were not mere hecatombs. On August 16, Bredow's charge and that of the First Prussian Dragoon Guards completely attained the result sought; also, on the same day, the charges on the Yron Plateau were not useless, for they helped to stop the offensive action of the Ladmirault Corps, so dangerous for the German left wing.

A troop of cavalry, even the smallest, can no longer appear in close order in the zone of artillery, and still less in the zone of infantry fire.

This was true in 1870; but the impossibility of cavalry remaining in range in sight of artillery or infantry did not hinder its use for proper purposes, which are to reconnoiter the enemy's flanks, protect the flanks of its own army, watch the large open intervals in the line, and take part in the action when an opportunity presents itself; the terrain of central Europe being more or less broken, there was no field of battle which did not offer masks capable of covering the cavalry units at a short distance behind the troops engaged.

The reconnaissance being stopped at a great distance by the long range and rapidity of a fire, the origin of which can not be told exactly, all that can be known is the points at which the enemy has not been found at a stated time.

Numerous reconnoitering bodies covering a large front, who receive a fire at long range without being able to return it effectively, not being able to determine its origin exactly, nevertheless mark the location and extent of the enemy's position, "coasting along his dangerous zone," to use the author's expression.

It has never entered anybody's head, even so far back as 1870, to allow the reconnaissance of cavalry to enter the meshes of a system of mixed outposts when the latter are well posted.

It is in operating on the flanks of an enemy marching or in position that reconnaissances can hope, if they are well conducted, to get near enough to see strong columns or large camps.

But is it not of great importance to be able to coast along the dangerous zone of the whole extent of the line occupied either by the enemy's advance posts or by his main force?

Besides, this could not be accomplished except partially and by the use of great skill, if the enemy had a numerous and active cavalry keeping watch at a long distance around troops which it was charged with covering.

According to the author the reconnaissance which Captain Gilbert has called "negative" is the only one which in this day can produce precise reports. The assertion is inexact, considering that in 1870, despite the fear inspired by the *chassepot*—a rapid-fire, long-range weapon—the reconnaissances of the German cavalry, particularly from the 26th to the 31st of August, would often cut the line of march of the army of Chalons, locate its bivouacs, and furnish valuable reports to the General Staff.

It will be said in reply that the German cavalry had an easy task on account of the unlucky division of the French cavalry and its incapacity in the matter of reconnaissance. This is the truth, but in war the two adversaries are never equal, and the stronger or more skillful surpasses the other, without which there would be neither victor nor victory.

This failure of the cavalry to justify the hopes placed on it in reconnaissance was so absolute that the other troops ceased to look for any security from this arm.

The author handles sophism with an unexcelled dexterity. A short time ago he told us that "the reconnaissance was stopped at a great distance, and could only tell the points at which the enemy was not found."

Now he says that the failure of the cavalry "in reconnaissance" resulted in taking from the other troops all confidence in the "rôle of security" confided to this arm.

Failure of the cavalry.

The term is harsh, besides it applies only to English cavalry operating against Boers—all horsemen and all extraordinary riflemen.

Every time that European cavalry has found itself opposed to a nation of horsemen it has had to give over reconnaissance duty to small detachments. This was so with the French cavalry against the Cossacks in 1807, 1812, 1813, and 1814. It was so likewise in Algeria during the first years of the conquest, until the time that natives rallying to the cause of France formed flying columns and relieved our cavalry of the duty of reconnaissance.

The author then states that the English cavalry, discarding its lances and even its sabres, took its carbine and became mounted infantry. Much good this did it.

It would be necessary to see this cavalry operating in Europe according to the same principles. But we shall not see it, for the English have too good sense ever to do such a thing.

The artillery tried to combine the effect of their heavy guns and the rapid-fire pieces of the horse artillery. They sought to establish their batteries in a long line, making all their fire converge on a single point, so as to cause at the same time a direct and oblique fire.

The eyewitness whose notes we have analyzed says not a word of the artillery being established in a long line. On the contrary, he states that the batteries were established on the flanks when the advance guard operated at a long distance from the main body, and that the artillery went into action either in the wings or in the intervals between battalions when the infantry divisions were engaged.

On the other hand, the lessons that have been drawn from the South African war agree on the point that the English artillery, though always showing great bravery, often oper-

ated on its own account and in mass without appearing to suspect the existence of conditions which demanded on its part the preparation of an infantry attack.

The systematic division of forces, of which the author seems to be an ardent apostle, denotes in him and in his co-religionists a state of mind which was manifested in the conduct of military affairs at the time of the Terror.

The 14 armies of the Republic were deployed on the menaced frontiers (they were all menaced), which they covered in a cordon, and in each army of 20,000 to 35,000 men the troops were likewise in cordon.

To-day the screen replaces the cordon, but at bottom they are same thing—weakness throughout—and defeat insured, in case the enemy attacks at some single point chosen by him.

In truth, the armies of the first coalition showed themselves so pusillanimous and acted with such weakness that at that time the French barely escaped dismemberment.

The results obtained with heavy projectiles charged with lyddite (melinite) were very poor.

That can be conceived, since the Boers never defended an inclosed area, being almost always hidden in deep trenches or behind rocks.

On the contrary, the effect of shrapnel was always formidable. To return to the language used by the author:

The projectiles of the English artillery had only a small effect. "Our shrapnel frightened the Boers but did not kill them," wrote Lord Methuen; "their bullets lacked force."

In the quotations to follow, we can see more and more that the author has an imagination which causes him to take his own ideas for facts.

The division of artillery has become the rule.

We have discussed this before.

Every body of infantry, however small, ought to be accompanied by cavalry to open its way, and by artillery to protect its march.

On the field of battle in the second part of the South African war one does not find a trace of little columns of infantry accompanied by cavalry or artillery, for the author is speaking of action in battle.

It is different with flying columns, operating singly to subdue the country and pursue groups of partisans. In this case they should be made up of elements of the three arms.

The ancient axiom, "Fire draws fire," is now modified as follows: "Visibility draws fire."

Certainly. But this is mere play upon words.

The infantry can no longer fight except prone.

The necessity for infantry to lie down was already apparent in 1870-71.

The author then explains that for moving forward by crawling or by rushes the soldier should be without knapsack, his only equipment being the haversack, the individual mess kit, and the blanket roll.

At the battles of Spicheren, Wissemburg, Froeschwiller, Borny, Mars-la-Tour, and St. Privat, both French and Germans fought without knapsacks. The several patrols of the Prussian Fifth Corps made prisoner during the battle of Froeschwiller were provided with the haversack, had the cloak across the shoulder, supporting at its lower part the mess kit, and wore a cap, the helmet being suspended by its chin strap.

Whatever may be desired, hotly contested battles demand that the soldier shall be relieved of the heavy knapsack which he ordinarily carries.

Hence the necessity of a knapsack made in two parts, the one designed never to be removed from the soldier, the other susceptible of being loaded on the company wagons or some other vehicle.

The author desires for our infantry a cartridge bandolier, a khaki uniform, and for a headdress a soft hat, the color of the ground, with broad brim raised on the left side. He even wishes bone buttons.

The author very much approves of Lord Roberts arming the officers, even the captains, with rifles, and making their dress like their men's.

With regard to a gaudy headdress, it occurs to us that after the war of 1870-71 our infantry officers were unanimous in demanding that the red cap should be replaced by a blue one, on the ground that their men, when lying down as skirmishers, generally took the precaution to remove their caps, considered by them as too distinctly visible, and laid them by their sides.

In 1872 or 1873 boards were ordered convened to consider the question of replacing the red cap with the blue, and they considered a long time. We are still waiting for their decision.

The author has a horror for plumes, and does not hide his disdain for what he terms "military dandies."

The uniform of his dreams is no doubt composed of a blouse to hide the leanness or deformity of the body, and a broad-brimmed hat to shade the eyes.

Provided with this outfit deformed or ugly men need not envy their more fortunate brethren, for one and all are equally horrible.

Apropos, the "Voyage on the Rhine," by J. J. Weiss, contains a very amusing chapter which treats of the trials of an officer of Prussian hussars, and ends with the term "the unhappy hussar," something which would be truly a phenomenon in the French army of to-day.

Some years before the war of 1870 a certain ministry, perhaps very efficient, suppressed the élite companies, took the sabertache from the hussars, the patrol jacket from the cavalry and artillery, gave the dragoons the tunic, and disbanded the cavalry and artillery bands. It showed poor knowledge of human nature.

To bring their men on the line the officers made use of narrow formations, winding and deep. Often they used the Indian file because, they said, it is easier to make men follow their file leader than to direct themselves.

To our knowledge none of the works compiled from the words or writings of English officers who took part in the South African war have mentioned narrow formations or Indian file in approaching the firing point.

The English made their march of approach in successive lines of skirmishers and in no other way.

At 1,000 meters a rifle ball will penetrate four men placed one behind another.

This alone indicates that narrow formations or Indian file, though they may be permissible under long-range artillery fire, should not be used in a march exposed to musketry fire.

The invisibility of the enemy was a new factor, hitherto unprovided for in the scheme of instruction of combatants.

The Boers in their deep trenches were invisible at 1,000 meters. This is an undeniable fact. But our soldiers are provided, and have been for a long time, with smokeless powder, so that the slight visibility of the enemy at long and mean ranges has become familiar to them in maneuvers of opposing troops where blank cartridges were used.

With the power of acceleration of fire conferred by repeating arms a single man firing rapidly produces the same effect as ten men firing normally, and it is impossible to tell the difference.

This assertion shows what error imagination can give rise to when it is not aided by experience.

A soldier fires normally 6 or 7 shots a minute. According to the author the same soldier firing rapidly could fire 60 shots a minute, or one shot each second.

Now, it is a fact that by using the magazine or clip a skilled rifleman could fire a dozen shots a minute, and yet he would be out of ammunition after three or four minutes of such fire. All officers of infantry know that.

The author specifies the sticking to cover, and the tendency to remain stationary, as the two "great enemies which paralyze the action and weaken the courage of the combatant," and he adds:

"The moral education of the man and the technical education of the soldier are the two levers by which the combatant can be detached from cover and carried forward."

Would he have the moral education of the man distinct from the technical education of the soldier?

This would be a grave error of a psychological order. No; the soldier can not be made into twins.

He joins his regiment with qualities and faults, which he possesses by inheritance, and a little education, which he owes to his family and his teachers.

From the day he enters the service his commanders strive to develop his good qualities, correct his faults, and teach him, outside of the necessary technical knowledge, love for his flag, devotion to his comrades, confidence in his commanders, esprit de corps, emulation, and a desire to distinguish himself in war, even at the sacrifice of his life.

The conception of the combination citizen-soldier belongs to the domain of metaphysics. It haunts the brains of idealists, excited by a desire to found a social order purely rational, without taking into account heredity, traditions, and habits, which render every man the slave of the past.

The author then draws the reader into an extended discussion of tactics, seeking to show that England, due solely to the fact that it draws its nourishment from beyond its borders, is scarcely more powerful to-day than it was fifty years ago.

To prove this he says that with 240,000 English against 12,000 Boers these disproportionate forces were in equilibrium.

According to this, a Boer was equal to twenty English soldiers. This scarcely flatters "Tommy."

In truth, the article of the *Revue des Deux Mondes* should have been written before the conclusion of peace, at a time when the author believed the South African war would last forever.

But after the month of October, 1900, the campaign was virtually ended.

There follows a literary amplification of the old idea that in war "iron is as valuable as gold."

Returning to tactics, the author says:

We must take into account the fact that the present arms carry to its highest point the action of skirmishers in a new form, in which each soldier must act independently, and in the fullness of his individual will to meet the enemy and destroy him.

This is a return to barbarism, pure and simple, with its hordes lacking organization, command, and discipline.

And that is the ideal he offers us. Many thanks!

The author then describes the difficulties experienced at present in making good soldiers on account of the increasing prosperity of the people and the extreme intellectual refinement of men, and he cites in support of his statements the Chinese soldier, contemptuous of death and slow in combat; but what he forgets to say is that the same Chinese soldier who fled disgracefully under fire when commanded by an ignorant mandarin becomes a very brave soldier when he comes under the orders of a good European commander.

To finish with the quotations from the author:

Fear is an illness; like other illnesses it has its prevention. It consists (the prevention) in a methodical development of good physical qualities, of the will, and of energy, in the child and young man.

According to this course of reasoning, the mother of a family first, and the schoolmaster afterwards, should exercise a true priestly influence. The regiment is powerless to bring forth these qualities.

The spirit of sacrifice is not acquired by theories in the study. Officers can only develop by technical instruction, and by guarding against diminishing under the pretext of discipline, the initiative and individuality of the young man who has become a soldier.

Fear is not an ordinary illness; for, being often of ancestral origin, it is intimately connected with racial and family qualities.

Napoleon, who ought to know, wrote:

Bravery is an innate quality; it can not be acquired.

Officers who have led men under fire for the first time remember their surprise at the bearing of certain soldiers,

entirely different from what it was before. This bully drops from sight and that despised weakling shines in the first rank.

We do not mean by this that it is useless to develop force and address as well as energy and strength of will.

These qualities help to increase a man's courage by the self-confidence which they provoke; but they are powerless to manufacture courage when it is not present in the blood.

The education of physical powers, energy, and will can evidently be commenced at an early age to the great profit of the race.

In this respect English education ought to serve us as a model. But we are still far from it, despite the honorable attempts made recently in several directions by M. Demolins and his disciples.

As a matter of fact most French mothers spoil their children, and schoolmasters, outside of their purely book teaching, have a marked repugnance for anything which savors of physical force.

It is a merely utopian theory, the attributing actually to a mother or a schoolmaster the exercise of the priestly influence of which the author speaks.

Later, when the methods of education now in use are transformed entirely, we can hope for some success in the participation of the university in the development of physical powers and character in the child and young man.

The gymnastic and shooting clubs would exercise a salutary influence on the youth of the land if they were more numerous, or, above all, composed of better material; but the sons of the middle class disdain them, and the sons of the farmers care nothing for them.

Actually, there is no medium so favorable for the physical and moral education of young France as the regiment, on condition that the officers and noncommissioned officers are enthusiastic in their work and acquit themselves with the same zeal and competence that they attempt to inculcate in others.

The author refuses to the regiment all educative mission, and makes this sally:

The spirit of sacrifice is not acquired by theories in the study.

Is the miserable method of theories in the study the only one he knows?

The last phrase of the quotation from the *Revue des Deux Mondes* strengthens the idea previously put forward by the author, under which the officer would be reduced to the simple rôle of technical instructor. It is no longer desired that the officer shall exercise over his command an overwhelming influence, that he shall be its head and its heart, and the schoolmaster is now to be depended upon to make men capable of braving death on the field of battle.

But we well know that a tactical unit is useless without its chiefs, and that these chiefs can not command it under fire except on condition that it has been welded together physically, morally, and technically in time of peace, and welded by themselves.

For thirty-five years it has been admitted in France that the master of the Prussian Military School gained the battle of Sadowa.

At the same time the idealogues, so numerous and so blatant in our country, conducted a campaign against what we now call militarism, saying that in case of war it would suffice, as in 1793, to strike the ground and armies would appear. To the discipline and automatic action of the Prussians they wished to oppose "intelligent bayonets" and "ramparts of muscle."

In spite of cultivating traditions one generation succeeds another without profiting by its experiences, so much so that entirely utopian theories condemned by facts reappear at fixed intervals and, far from being combated, meet a favorable reception from young men who are ignorant of a relatively recent past.

To recapitulate, the article of the *Revue des Deux Mondes* of June 15, leans on a great number of observations made during the South African war, some discreet, others contestable, in an attempt to destroy the tactical doctrines founded on the campaigns of Napoleon, and more recently on those of the Franco-Prussian war.

To these doctrines, almost perfect, the author opposes the "War of Screens," nourished by numerous small mixed columns.

His method is simplicity itself; for this reason it ought to find favor with the ignorant.

CONCLUSIONS.

Our own conclusions, drawn from the South African war, are a little different:

1. The almost complete absence of artillery on the Boer side, distorting the conditions of battle, prevents us from forming a precise idea of the appearance of action in a war between European powers.

For instance, the march of approach of the troops of the English second line would have been very difficult, one can almost say impossible, in the face of fire from numerous rapid-fire batteries of artillery.

2. The power of the present rifle increases the normal distance of infantry action to about 800 meters, in place of 400 meters, which it was in 1870, and 600 meters, which it would have been with the rifle model 1874.

3. The slight visibility of the enemy, resulting from the use of smokeless powder and the extended employment of field fortification, renders the approach very long and very laborious, with an increase of losses, and gives a much greater duration than formerly to engagements.

4. The power of the present armament causes the advance guards to be split up, before they are subjected to an effective artillery fire, into small parties destined to engage in the reconnoitering action, which spreads itself before the enemy's line and induces a wear-and-tear action over the entire front.

5. The nervous exhaustion present always, but taking place more quickly nowadays on account of the shorter duration of active service, the slight visibility of the enemy, and the high-power armament demands that the troops engaged shall be progressively nourished by the opportune and periodical arrival on the firing line of fresh troops in closely calculated numbers, and, on the other hand, that the troops not engaged shall be spared as much as possible from the depression caused by useless losses by taking cover from the view and fire of the enemy, by judicious employment of sheltering obstacles and the depressions of the ground.

6. The extended duration of battles, which will continue perhaps for several days, the necessity of nourishing the action along the entire front, and perhaps the relief, after 5 or 6 hours' fighting, of the troops actively engaged, lead us to

believe that the entire fighting front of an army corps should not exceed the dimensions allowed at present, which vary from 3 to 5 kilometers.

7. The division of fighting units, the imperious necessity for taking advantage of the slightest cover, and, lacking cover, of fighting prone; finally, the impossibility of officers exercising active command over their men by standing behind them, all result in requiring on the part of the individual skirmisher a stronger morale than formerly.

Soldiers in whom a good military education, developed by example, by exercise, and by discipline, has inculcated an absolute confidence in themselves, their comrades, and their leaders, these soldiers will fight well despite their isolation, and, if they should be killed, their death will cost the enemy dear.

On account of the powerful armament of the artillery and infantry, the front of a position has become almost inviolable throughout almost its whole extent; but a skillful general will be able to discover a zone of approach and a favorable position for assembling for the attack; or, better still, a feeble point in the enemy's line, which will be either a badly flanked salient in his front or a wing badly supported or difficult of protection.

The inviolability of the front of a position, even for forces sensibly superior to those defending it, causes the decision to be sought in a surprise attack, powerful, well prepared, and carried out against the point judged most favorable.

A strong surprise attack presupposes secret concentration, at a short distance from the point of attack, with a harmony of arrangements very superior to those which the enemy can have at this point.

The preparation is carried out by numerous skirmishers, taking advantage of cover toward the objective with the aid of numerous guns, which, after silencing the enemy's artillery, turn their fire on the enemy's infantry.

The execution is the last phase of the action. It consists of putting in motion the attacking mass, charged with following up in the interior of the position a previous success of the skirmishers, who have been progressively reenforced, and, with the aid of the artillery, have taken possession of the captured portion of the position.

We shall amplify the outline traced by us of the methods of decisive attack.

Captain Gilbert, whose death in October, 1901, was an irreparable loss to military art, left a work entitled "The South African War," and his conclusions, in which we concur, are as follows:

Conducted in a theater and with means entirely different from those we should see in Central Europe, the South African war can evidently not throw a great light on the mysteries of future wars.

Between these conflicts of great nations, from which the imagination recoils and the heroic resistance of a handful of peasants, the difference is even greater than that between the wars of the Vendée and those of the First Empire. The employment even of our perfected weapons was here on too small a scale and with too much inexperience; the statement of results is not yet sufficiently in documentary form for us to draw exact conclusions on elementary tactics.

During the years immediately following the war of 1870 the question of the action of approach of infantry in open country occupied, at least as fully as it does to-day, the officers of infantry, both French and German, who had taken part in the great battles of this war.

The scattered formations for traversing open spaces, the re-forming of units in the successive firing positions, and the means of acquiring a superiority of fire were the objects of experimental researches as numerous as they were varied.

These came to an end in France after the adoption of the regulations of 1875, and in Germany a year later when the regulations of 1876 appeared.

General Prince Hohenlohe-Ingelfingen states in one of his "Letters on Infantry" (1885) that among the experimental formations immediately after the war of 1870 for an attack over bare ground, the strangest dispositions could be found, among others the following:

Each battalion covered entirely a square of 300 paces on each side, with files of two men each, and he adds, "It is only right to ask if in this case the '*general suave qui peut*' was not carried to the height of a principle."

The eminent author^a of the work *New Order of Tactics*, published in the *Revue Militaire de l'Etranger* of October, 1874, sums up as follows the principles regarded as axioms in the German army of the time:

The action of skirmishers, the dispersed order, call it what you will, is the only formation for infantry in action. The action of skirmishers opens, prepares, and decides the

^a Captain Cardot, since made a general officer, as all know. The "New Order of Tactics" was the subject of three articles appearing in the numbers for October 6, October 16, and November 16, 1874.

result of the action. The attack on the enemy's continuous line is no longer possible except by successive approaches and by the aid of a fire more and more nourished and without sensible intermittence.

The skirmishers advance by fractions, with successive short rushes at full speed, taking cover or lying flat; they are followed, reenforced, and sustained by the other fractions of the advance line,^a which employs like methods in advancing.

The main body of the battalion conforms to the movement, dividing up and taking open order if the intensity of the enemy's fire or the configuration of the ground renders this necessary.

And the author concludes:

It is for the French officers that we must resume in a short space the principles so often stated in this work:

The *law* of modern warfare is the indissoluble alliance of fire and the offensive; in other terms, shock action and fire action, the intimate mixture, the incessant alternation of the advance and the fire of musketry in all its forms.

The *expression* of this law, its *manifestation*, is the action of skirmishers, the dispersed order, the individual order; the name is of no importance.

The *model*, if one is necessary, is the company column, or, more exactly, the system of subunits of the battalion.

The *characteristic* is individuality.

In 1874 the vivid remembrance of checks given four years before to infantry attacks insufficiently prepared by fire, dictated methods of attack identical with those which the South African war seems to have brought forth, and these methods were applied in France by the regulations of June 12, 1875, which were replaced by those of July 29, 1884.

But armies require from time to time a whipping to wake them up, otherwise they allow themselves to glide down the incline which leads to indifference, and to the loss, little by little, of a true knowledge of war.

In default of campaigns to stimulate their energy, armies which have slept long in the delights of peace find an excitant in every murderous war which takes place abroad, and it is thus that the Russo-Turkish war of 1878, and more recently the South African war, have furnished an occasion for the armies of Western Europe to renew their vigor and to a certain extent to find a new field for their warlike activity.

Under this head the articles appearing last year in Germany, and devoted to the lessons that can be drawn from the late South African war, are very interesting. We shall give them a passing glance.

^a In Germany, in a battalion in action, the "advance line" is the line formed by the companies called in France the "first line;" and the "principal line" is that formed by the companies called in France the "second line."

The first in date of these publications is the lecture given March 5, 1902, in Berlin by Lieutenant-Colonel Lindenau, chief of a section of the Prussian General Staff.

The author considers especially the methods of infantry attack over open ground as influenced by the lessons of the South African war, and he sums up in these words:

If we take a general view of the infantry attack as exemplified in the South African war, we see that every attempt to carry out an attack by regular or mechanical movements failed utterly.

The attack never progressed surely unless sustained by an incessant fire and patiently conducted from firing point to firing point. In the Transvaal, whenever firing positions could not be found, the attack over open country received a check. It was necessary in this case either to construct cover under the protection of darkness with the intrenching tool, or to remain motionless while awaiting a success in some more favorable portion of the terrain.

The Boer war showed what too precipitous attacks can lead to with our present armament. We must not imitate the English, who attacked the Boers more often with their feet than with their guns.

And Lieutenant-Colonel Lindenau concludes:

More than ever the infantry attack of the future will, in all its phases, have more of an individual character.

Sometimes rushing forward, sometimes lying down and motionless, sometimes walking, sometimes running, but ceaselessly utilizing cover afforded by the terrain, the assailant will advance, little by little, sustained by fire from chosen points of vantage and from well organized wings. They will often have to fight motionless for hours at a time in order to obtain a superiority of fire * * *.

It will be due to an unshakable tenacity and perseverance rather than to a division into disorganized powder that the attack will progress, and it will progress so much the better if everything has been prepared calmly and methodically * * *.

In the future, as in the past, the attack of infantry endowed with immense destructive force will remain generally the surest means of gathering the laurels of victory.

The preceding remarks are not unjustifiable, but they savor too much of pure theory, and do not take into account the necessary considerations of tactical requirements and unity of action.

General de Scherf, well known for his philosophical and military works, replied to Lieutenant-Colonel Lindenau in a brochure entitled *Ensemble or Individualism in Attack*.

General de Scherf is an upholder of the normal methods of attack. In this respect he goes a little too far, considering that, in a general way, the dispositions for decisive attack that can be made by a certain unit are not extremely varied on account of the narrow conditions that must be fulfilled by every attack which is sent with a rush against the enemy, in order to make it move with *éclat*.

But there is little agreement on this subject, because every man's point of view differs from that of his neighbor.

In our opinion the division of the attacking troops might be carried as far as desired, provided the mass of troops destined to enlarge the breach and convert a partial success into a victory shall be formed compactly ready to maneuver or deploy, as the case may be.

General de Stieler, in the *Jahrbucher* for October 1902, is less exclusive than General de Scherf, but he wishes to put young officers on their guard against becoming enamored of methods of attack which are too artificial.

Here are some of his observations:

What causes us to go endlessly astray on the events of the Boer war is that we ignore the psychology of battle.

Neither the targets nor the marksmen at Spandau (Prussian Normal School for Target Practice), any more than the Boers in the Transvaal, give a psychologically correct impression.

If the targets returned the fire, the per cent of hits would be considerably lowered; and if the Boers, hidden in their trenches, and only slightly disturbed by the enemy's fire, had been compelled to suffer stronger moral impressions, the English, despite their formations, would not have had to suffer such considerable losses.

One is forced to the conclusion that in battle the best method of taking cover is not found in the terrain nor in complicated formations.

The best cover is in the *conduct of fire*.

We must make sure of a superiority of fire, without which we can not advance any better than the English.

It is with the *tactics of fire* that we must work.

The "Boer tactics" caused a loss of precious time, with all its consequences.

The troops are divided into infinitely small parts, these molecules are divided still farther, one is pushed forward, the other held back, the voice of the commander is heard, the units are intermixed with each other, the command is given, the troops leave cover and throw themselves forward.

This is not war.

Those who have made war know that the officer has the greatest difficulty in getting his men away from even the smallest shelter and carrying them forward.

In an army of a million men who have never before taken part in a war, there are nothing but heroes in the rough. The most ardent patriotism often has need of discipline when it becomes a question of playing with death.

Discipline, cohesion, and marksmanship, alone will take us into the enemy's ranks.

General de Steiler then goes on to show that on the field of battle all blows do not come from the front, and that certain formations, only slightly vulnerable when projectiles are directed against them from the normal direction, become very dangerous when attacked on the flank.

General de Steiler's conclusion is that on the field of battle, when bullets are whizzing past the head, one can not make an advance except with troops well in hand and strongly commanded.

There appeared in July, 1902, an anonymous article entitled *Action of German infantry*, as determined by the experience gained at Döberitz, near Berlin, in 1902.

The author begins by establishing the fact that in open country the troops of the first line advancing against an enemy in position ought to employ formations and methods which will enable them to arrive with minimum losses at the first firing position, chosen at 500 to 800 meters from the enemy.

To this end he recommends, even at long ranges, chains of skirmishers with 8 to 12 meters interval, moving by squads, which execute rushes of 20 to 30 meters, even on all fours, carrying the rifle by the sling in the teeth.

The author then gives a system of instruction in this method for the man, the file, the squad, the platoon, and the company.

The squad which arrives first at the initial firing position takes cover and waits till it is joined by the other squads of the platoon, when the chief of platoon gives the commands for firing.^a

During the approach to the first firing position the squads, echeloned from front to rear, ought not to execute their rushes at the same time.

The supports employ similar methods in reaching positions which correspond to the first firing position.

Before the engagement the superior officers and captains ride rapidly to a point favorable for observation, and while making their observations use "Apache" methods to keep from being seen.

If the terrain offers ways favoring the march of approach they are utilized by modifying the formations to suit the ground.

At the proper time successive firing positions toward the enemy are occupied by the same methods, the groups remaining in rear protecting by their fire those which have moved forward.

The author bases his conclusions on a certain number of maneuvers, which he describes with care.

These maneuvers, participated in by the author and taking place at Döberitz in May, 1902, seem to have been fully reviewed and corrected, but their greatest value is in view of the tendencies which they exemplify.

In a final analysis the author shows that he sees no necessity for revising the regulations. He limits himself to inter-

^a The Prussian company is divided into three platoons, each commanded by an officer.

preting them with regard to the elasticity of the elements of the first line, submitted to a musketry fire in an open country while gaining the first firing position, and later, after a superiority of fire is gained, in moving to the successive firing positions toward the enemy, the last of which marks the line of departure of the direct attack on the enemy's position.

The ideas of the author, though finding certain favor with the German military public, were opposed by some publications, among them the *Militär Wochenblatt*, which, in its number for September 13, 1902, criticises, over the signature of Major Hurt:

1. The advance by rushes, executed by squads.
2. The dispersion of the supports.

This criticism is not lacking in justice, for the system extolled by the anonymous author of *German infantry in 1902* for carrying out the advance of the first line in open country and under musketry fire seems more theoretical than practical in actual war.

To sum up, the researches and experiences of last year in Germany, with regard to the modifications which the lessons of the South African war are susceptible of making in the present tactics, agree unanimously in maintaining the present regulations on the subject; but they have resulted in exciting the intellectual activity of the officers, and leading them to choose, in each particular case, the most appropriate dispositions for attaining the desired result with a minimum of losses and without abandoning a morsel of their command over their troops, which is an essential condition of unity of action, and is the key to success in war.

To-day, in France, opinions on tactical methods are more divided than elsewhere, and form two distinct currents of ideas.

On one side the tacticians of the historical school, much the more numerous, remain faithful to the traditions of the Napoleonic wars, laboriously reconstructed in our army after the events of 1870-71, and analyze the events of recent wars with a view to modifying the present tactics as required by the increasing power of armament.

On the other hand, the tacticians of the rational school, who make up for their lack of numbers by an ardor somewhat noisy, wish to revolutionize the present tactics, or rather

abolish them entirely, and substitute a system of tactics entirely new, which they call "the tactics of the future."

Revolution is a synonym for violent remedy, capable of killing the invalid, and its use is not justified except in desperate cases.

The present system of tactics is far from requiring such treatment.

THE GERMAN INFANTRY REGULATIONS AS TESTED BY THE EXPERIENCES OF THE BOER WAR.

Translated from *La France Militaire* (June, 1904) for the Second Division, General Staff,
by First Lieut. S. M. DE LOFFRE, Assistant Surgeon, U. S. Army.

A very interesting study due to Lieutenant von Gentz, of the Second Lorraine Infantry, No. 131, has just appeared in the *Militär Wochenblatt*. It is entitled: "Do the Lessons of the South African War Authorize us to Modify our Infantry Tactics?"^a We give below the translation.

Rarely in its time has a campaign so greatly aroused the interest of all civilized nations as the South African war has done. Although this interest seems actually lessened by reason of the South-west African war and the war in the extreme Orient, and although we may hope to see certain tactical questions cleared up in the Russo-Japanese war, nevertheless the observations of an officer who took part in the Transvaal war are still valuable to-day.^b

Even to the military world, this last war has offered, outside of political events, much that is new, and numerous facts deserving attention, but it has also given rise to many problems whose solution is not yet known.

The partisans of the militia in Europe have followed with intense interest the campaign in the Transvaal, which, from the beginning, seemed to produce many arguments in favor of their theories.

To any casual observer of events it seemed to be clearly proven that, in this particular case, an army composed of militia could be used in war and could be of service. The adversaries of the militia had, for a short time, as their only argument against this demonstration brought about by the

^aLieutenant von Gentz was present with the Boer forces during the war.

^bThis article was written before the battle on the Yalu.

Transvaal campaign, this one confirmation: The mercenary English army could not be compared to an European army having the present organization. These two ways of thinking were as false, one as the other. They were due to a complete ignorance of the true conditions of war in this theater of operations. On the one hand the English troops were not even of ordinary worth (impartial military critics agree on this subject); on the other hand, the victories of the Boers were not in any way a striking proof of the value, in war, of militia, whose worth was not manifested in a first outburst of exalted patriotism, but was rather belied by a long-drawn out and difficult war comprising many hardships. And the reverses sustained by the Boer army will occur to every army composed of militia.

The reasons for the first successes of the Boers, which caused great surprise but did not keep up, naturally, and which led to so many false conclusions, were the following:

I. The mountainous nature of the country, very difficult, offering all the advantages to the defender and unfavorable to the invading army, especially for its artillery.

II. The fact that the Boers held themselves nearly always on the defensive, even when on the strategical offensive, whereas the English were always attacking, often with an insufficient numerical superiority.

III. The initial mistakes made by the English.

IV. Finally, the advantage the Boers had of being acclimated, and of having opposed to them adversaries—officers and soldiers—little acquainted with the nature of the country or the geography of the theatre of operations.

Nevertheless, in Germany they did not fail to make “much ado about nothing,” and to demand a premature modification of the tactics, up to the time when the invalid suppositions on which the partisans of reform dwelt were irrefutably brought to light.

On account of the numerous factors put into play, with which we would not have to contend in Europe it was especially difficult, in this South African war, to appreciate fully the value of the operations and successes of both sides. It is not so easy as one thinks, even for those who were able to form an opinion on the ground itself from what they saw and went through, to adapt their conclusions and observations to our

army, in equal proportions. Having said this, I here propose to take up again the following points, which are nothing else than the reproduction of my particular impressions and ideas, maybe without value, but personal.

I wish first to answer the questions asked in the title of my subject. To the attentive and educated observer of military matters, the South African war only taught one lesson. In almost all cases, the application of the tactical rules of our German regulations would have been perfect, and the best adapted to the purposes in view; it would have assured, more than any other, numerous successes.

If the teachings of war seem to demand a modification of our tactics, it is especially on account of the habits contracted during drills. It is only in very rare cases that these lessons are at variance with our regulations governing maneuvers.

The enormous and surprising effects of small-caliber fire on the attacking infantry, which were manifested for the first time by the attacks of the English infantry, and the insurmountable difficulties met with in these attacks against an adversary armed with modern weapons; the fact that in the attacks of the English infantry they failed to apply the principles laid down for attacks in the German maneuvers and that these attacks were more often made in schematic formations, similar to those we may see applied on our drill grounds—all these circumstances, I say, served as a demonstration of our tactical principles, now in use, for infantry attacks, taking into account the several factors of modern warfare. This demonstration is an unquestionable proof to-day of the excellence of our regulations governing warfare.

Some military writers go so far in their estimation of the importance of rapid-fire guns that they declare that a front attack on level ground is in all cases impossible, and they base their opinion on the reverses sustained by the English in the Transvaal. But before the experiences of the South African war we already knew (and the regulations read so in large type) that no one could dream of making an attack on open ground unless he had obtained the superiority of fire. This can only be obtained in war after several hours of fighting, often after several days; moreover, no one ignores it, as is shown by the impossibility of carrying out an action of such length at the time of our exercises of instruction.

Contrary to our regulations, which make the effect of the fire the principal object, the old English regulations, which were still in force during the war, read: "The advance must be made as quickly as possible, as the bayonet charge is the chief object in view."^a

This antiquated tendency, long since dropped by the continental armies of Europe, manifested itself very frequently with the English in the Transvaal, and they often sought the outcome of the attack in battle by hand-to-hand encounters, without having first sufficiently prepared for this attack by fire, either by infantry or artillery fire. And this was one of the chief causes of defeat for the English infantry, in spite of their having borrowed the formations from our regulations.

At Potgietersdrift, on the Tugela (from the 5th to the 8th of February, 1900), for instance, we had only 5 or 6 deaths and an insignificant number of wounded, after a bombardment which lasted 3 days from sunrise to sunset, of our infantry positions, reinforced only by about 5 pieces and executed by about 50 English guns. Such meager results could not be considered as having acquired a superiority of fire. On February 5 and 6, same result. As soon as our weak artillery momentarily ceased firing in the face of the strong English artillery fire, the English, believing that our guns were dismantled, would advance their infantry to the attack. During these 2 days the English infantry attack was repulsed all along the line by our artillery fire, weakened, but from new positions on the battlefield, before the infantry lines could come within range for small-arm fire. The assault of February 6 on the southernmost spur of the Vaalkranz was only partially successful, which could not affect the real outcome of the battle. This also happened on other battlefields.

As to what concerns two of the special formations of frontal attack, as indicated in articles 76 and 82 of the Regulations for Maneuvers, the South African war furnished examples which favor their employment. I mean examples of night attacks—that is to say, a renewal of the first part of the attack under cover of darkness and the beginning of a surprise in order to obtain the superiority of fire at the break of day.

^a The new English regulations, adopted after the Transvaal war, state that the importance of the fire is greater.

The English, who alone, in my opinion, are concerned in the discussion of offensive tactics in the Transvaal war, often had recourse to this procedure. When it was not followed by success, it was because they made other mistakes. In the battle of Spion Kop, for example (on the night of the 23d-24th of January, 1900), the daring night attack of Woodgate's brigade against our fortified position on Spion Kop succeeded in capturing from the Boers the key to their position almost without firing a shot, in spite of the great difficulties which the attacking force had to surmount. There, as is often the case, the defeat of the Boers was due to the tardy arrival and the small number of the reserve troops. Whoever took part in the terrible battle of January 24, fought between two skirmish lines lying only about 300 meters from each other, well knows how the result of the fight hung for many hours by a slender thread. On the night of the 24th-25th of January, during which Spion Kop was evacuated by both armies, we did not even know the final result of the battle and only learned it on the morning of the 25th. For some extraordinary reason the new English regulations make no allusion to the possibility of an attack of this nature under cover of darkness. The English attacks, in brief, have only clearly proven one thing: If the difficulties of the terrain or other causes do not necessitate a preliminary skirmish to obtain superiority of fire, as was often the case in the Transvaal, the advance during the day by a frontal attack to actual collision is an impossibility. We did not need the South African war to teach us this lesson, which is contained, as is commonly known, in that part of our regulations relating to attacks.

THIN OR DENSE LINES?

The Boer war particularly has brought to trial this much-discussed question, "Thin or dense lines?" which has started a lively controversy among military writers—a question upon which they are still far from agreeing. The chief point in this question is to bring the firing line up to the enemy with as few losses as possible. The advantages and disadvantages of thin and dense lines are numerous and balance each other pretty well. What the attacking force gains by advancing in a thin line to diminish its losses, it loses again by lessening

the effectiveness of the fire that would result from dense lines. This fact, which was clearly proven every day during the South African war, will lead us to use thin lines as a general rule in the first deployment, at long distances, in the combat position from which the fire can reach its greatest efficiency; also in the advance of the support, in combats where the object is to allow the real attack to make its dispositions; in brief, in all cases where there is no primordial reason for giving the maximum development to the effectiveness of the fire. In contrary cases it will be impossible to escape the necessity of manning, with guns, this position where we wish to acquire the superiority of fire, and we will do this in all the limited and available space, without an afterthought, and without letting ourselves be influenced by other circumstances. So then it should be thin or dense lines, according to the purpose of the fight or the tactical situation imposed by the terrain or by circumstances.

If the English, as a result of their experience in the late war, lay down the rule to-day that only thin lines should be used in fighting with rapid-fire guns, they defeat their object, in my opinion, and make the same mistakes that the Austrians did in 1859.

Their losses, during the latter part of the war, were due partly to the wrong teachings they drew from former battles: Thin lines under all circumstances. We find an example of this in an attack made by the English on February 5 on the Waalkranz positions (Tugela), where part of the thin line, marching with wide intervals successfully advanced without any serious loss to the position held by the Boers; but, in the latter part of the fight, on account of the lack of density of their skirmish lines, not receiving the proper support from the rear, they did not have the proper effectiveness of fire to profit by their successful start against the part of the positions that were still intact.

The answer to the question of thin or dense skirmish lines, given by the teachings of the South African war offers nothing new. Our maneuver regulations are very clear on this subject (first part, article 123; second part, articles 22, 23, 24, 25, 29, 65, 90, 91).

POSITIONS WHENCE THE FIRE WILL OBTAIN ITS
GREATEST EFFECTIVENESS.

As to what concerns fire action—although we must take into account the more extended view, due to the clearness of the air in Africa and favoring fire at a greater distance—the modern rifle should urge us, even under the conditions in which battles will be fought in future in Europe, to seek for a decision by fire at greater distances than those that the usual maneuvering grounds have accustomed us to up to this day. We used to admit as rules, in our exercises, that we must not open fire in offensive operations at more than 800 meters, and when on the defensive at more than 1,000 meters. The great effectiveness of the fire of the Boer infantry, often at 800 to 1,000 meters, has led us to advance the time for opening fire as well as the position chosen to give to the fire its greatest intensity; to use our guns at longer ranges, and to increase our target practice, which has made so much progress during the past ten years; finally, to give more time to open order-drills. Thin skirmish lines deployed to large intervals, the opening of fire at greater distances, the necessity of not exposing on the battlefield any force in close order, frequent dashes from rear to front of thin skirmish lines, advancing by rushes, plentifully supplied with ammunition, and giving an impulse to the firing line up to the last position of the line; such will be the character of offensive operations in future on open ground. There is nothing in these principles contrary to the spirit of the regulations, which prescribe, moreover, that all normal formations should be abandoned, without hesitation, if circumstances demand it.

TACTICAL DEDUCTIONS FROM THE BOER WAR AND THE GROUP ATTACK.^a

By A. VON BOGUSLAWSKI, Lieutenant-General, Unattached.

Translated from the German for the Second Division, General Staff, U. S. Army, by
Capt. FREDRIK L. KNUDSEN, Eighth Infantry.

INTRODUCTION.

The elements of battle-leading on a large scale are just as unchangeable as those of strategy. The information, preparation of the battle, the direction of the attack, the use of localities, the keeping back of reserves, the direction of masses on the decisive point, the turning movement, the breaking through, and the counterstroke at the proper moment, all play their rôles, and so it will be in the future. All these important matters were the same under Cæsar and Hannibal as under Frederick, Moltke, and Napoleon.

The spiritual agents, which constitute the inner value, as on the other hand, the weaknesses of the troops, will likewise remain the same. The psychological influence will often be forced into the background during a long period of peace, and its observation will be neglected.

But the changes in war material will bring about many changes in the fighting methods of individual organizations, and these influence one another. The art of employing troops will likewise be influenced by the tactics of the organizations.

There are consequently periods in which some point of the fundamental principles is more prominent and another more obscure. In this case the nature of nations, as regards temperament and character, has also an influence.

A direct attack will be attempted against the badly trained

^a *Taktische Folgerungen aus dem Burenkriege und der Gruppenangriff.* By Lieutenant-General A. von Boguslawski. Published by R. Eisenschmidt (Berlin, 1903), publishers of military literature.

and imperfectly disciplined troops coming from a decayed nation, while against another enemy the turning movement must be resorted to.

The cooperation of the different arms, whether in large or small units, is one of the conditions for effect in war. No arm can dispense with another; there are always moments in which now one, now another, will make itself more felt; one should therefore not be neglected at the expense of another. This applies not only to the organization, training, and armament, but also to the estimation they enjoy from the authorities and in the eyes of the people.

But notwithstanding this, the principal rôle in action will always fall to the infantry, as it can be used in any manner and is unhindered by localities, unless it be deep water and perpendicular mountain sides.

For this reason and because the tactics of infantry presents the greatest difficulties in its application, the commanders of armies, and with them military literature, have occupied themselves continually, since the introduction of the breech-loader and the improvements in weapons following thereon, in trying to discover the best form for that feature of infantry tactics which has again become the most difficult—the attack.

It was many times believed that a certain conclusion had been arrived at, when the war in South Africa, from 1899–1902, produced opinions which found expression in experiments that have taken place lately. The object of this book is to express our opinion concerning this. Let us first, however, review briefly the development of the tactics of the German infantry since the wars of the Great Emperor.

I. CHANGES AND OPINIONS FROM 1871 TO 1901.

The very large losses of the Germans in their attacks in the August battles of the great war, lead, just as now the experiences of the Boer war, to the study of how to avoid them; and its attainment was attempted—just as at the present again—by altered formations. Pursuant to the correct idea, the dispersed order of fighting which had decided 1870–71, of giving a greater extension, “strong skirmish lines” were pointed out as answering the purpose. To form these, even whole platoons were to be used. (Cabinet order of July 4, 1872.)

The supports may follow the skirmish line, not only in line

or in column, but also in ranks and dispersed order, with groups in close or extended order.

The advance by rushes was introduced. The rushes were to be 50 to 80 paces.

It is this that is of special interest to us in that Cabinet order at the present time. These formations were practiced experimentally; but the practical, war-accustomed eye of the Great Emperor perceived at once the uselessness of supports in extended order and in ranks, as also the dangers which these formations would entail, namely, the firing on the real skirmish line from the rear, and the disproportionate breaking up into atoms covering the whole battlefield.

In the cabinet order of April 13, 1873, the Emperor rejected the artificial extension of the supports and the rank formation—which also made difficult the supervision and influence of the officers in action—and allowed the latter formation only quite exceptionally.

The rushes were fixed at 50 to 60 paces. The proper idea of war and the consideration of the morale had consequently carried off the victory.

On the other hand, the authorities were not able to make up their minds to adapt the regulations entirely to the new requirements, and therefore they retained the battalion columns and lines, deployments from column, the third rank, etc., which had been declared in the selfsame cabinet order to be useless for infantry action in the first place. The regulations, however, gave such great latitude that the war training continued to progress gradually.

A new impulse was given thereto by the constantly more rapid evolution of the technique of firearms, increased penetration and range, flat trajectory, the introduction of the magazine rifle and smokeless powder. Special care was given to fire discipline, and it was for a long time believed that this was to be attained by designating a certain number of cartridges.

Troops in close order were, to be sure, still made to fire impossible volleys, but strong swarms of skirmishers were considered the principal means for fighting.

In 1877 the scientific firing instructions of Mieg was distributed to the army, at first as an anonymous work. Although

it did not on the whole bring anything new, it was a valuable contribution to the science of firing; but as it advocated long-range and volley firing, both were used to excess for a while. However, after a hot literary controversy, a reaction soon set in against these exaggerations. Improvements in the rifle were certainly taken into account, but a return was made to the principle of opening fire, especially in the attack, at the shortest possible ranges and acknowledging the skirmish fire as the principal kind of fire.

The extended-order fighting had taken firmer root, but the training was still made difficult by the practice of formations which would be impossible under the present fighting conditions.

Then, while excellent regulations for the performance of field service were issued in the period from 1872 to 1888, new drill regulations first appeared in 1888.

These extracted the quintessence of the experience derived from 1870-71, the maneuvers and the opinions advanced in military literature—yes, many paragraphs from the books that treated of tactics were adopted word for word in the regulations.

It does not seem necessary for our purpose to analyze here the regulations, since they are certainly known to our readers. The readers that belong to other arms are also sufficiently informed as to the infantry formations and its fighting methods. We point out only that the regulations, in II, 82, give general principles for the carrying out of the attack, wherein the strong swarms of skirmishers that are necessary are expressly emphasized. The unity of the attack, through the order of the highest commander for the assault, is pointed out as especially desirable. The regulations prohibit expressly any method of procedure which goes beyond the principles laid down in the above-mentioned part. We shall not again here make this much-disputed theme the subject of discussion—whether the regulations would not have done better to give some more explicit rules for carrying out the attack—since we must revert to them when considering the so-called new tactics of the attack.

Another important part of the regulations are the rules which have been designated by the name “task system.” It arose from the cogency of guaranteeing the initiative of the

subordinate leaders and avoiding superfluous and harmful interference with subordinate leaders. This is quite well in itself, and there are certainly many situations in which the assigning of individual tasks is necessary, but also, especially in great actions, such in which the simplest command is sufficient for a subordinate organization or troops, in order to direct it and make it act effectively. The regulations would have done well to emphasize this strongly, because it can not be denied that an exaggeration of the "task system" may cause a breaking up of the forces and a faulty cooperation. As valuable as the initiative of the subordinate leader is, it can, however, manifest itself only exceptionally in large operations of war.^a

It is also to be mentioned that the regulations emphasize strongly the influence which is to be exerted on the mind and the development of the soldier's character during his training, that there are further some brief principles where the soldier will be shown the moral factors which have a decisive influence in action.^b

The regulations finally emphasize quite decidedly that the mixing up of organizations is to be avoided as much as possible, but that if this can not be prevented the troops must also know how to fight in intermingled units, in close or extended order, in unformed ranks, or with an inverted front.

The regulations, based upon great experiences in war, are certainly adapted to the freeing of the infantry training from its bonds and to advancing it. But it was not unnatural that the continually progressive improvement of the artillery and the rifle, and furthermore the consideration of isolated war incidents, such as those of the Russo-Turkish war of 1877-78, did not permit the discussion of infantry tactics to cease. The results of the extraordinarily improved firing exercises on the terrain and on the maneuver grounds contributed thereto, and, as always in time of peace, incorrect conclusions for real fighting were often drawn from their results. Excellent works on the science of firing were written by reason of these exercises, but they also often caused a proneness to

^a This will also be reverted to later on.

^b We have already done this before in our small works, "Training and Inspection," and "The Conduct of the Infantry Soldier in Action."

ascribe a too great influence to the technical and ballistic elements in the consideration of fighting conditions, and to neglect too much the tactical side and psychological influences.

The results thereof were propositions which recommended an instantaneous and very considerable extension of front, in order to bring about at once and as much as possible an overlapping by employing very dense skirmish lines through which a decrease of depth took place of itself. Opposed to this method was, above all, the consideration that in great battles an extension will take place which will make superior leading, so difficult in itself, still more difficult.

In the second place, the demand for artificial formations, like those which had been thrown overboard in 1872, was made again, and all that was justified by the increased fire effect of infantry and artillery. The extension of the ranges found once more its advocates.

From all this proceeded the proposition that the decision in the attack is to be sought only and solely in the overlapping and superiority of the attacker. The fire fight was to be the decisive feature. Many went so far as to declare an attack over open ground impossible.

To this was also added the opinion of a high ranking officer that the decision by means of superiority of fire was to be sought only through proper change from strategical to tactical methods; that is to say, by means of a convenient advance of several columns, which would concentrate their fire on the battlefield.

This is certainly a very favorable condition when it is brought about, but it can not deliver us from seeking a tactical method for the frontal attack, which may also many a time be necessary in the case of great turning movements.

The opinion was also advanced that a kind of a siege method would be resorted to and that recourse must be had to the night for intrenching. Without wanting to press the concrete case I am, however, of the opinion that it has been the endeavor of every great leader, and will also be so in the future, to end a battle in one day if this is at all possible. Military history shows us that this has many times been impossible.

The advocates of this method advance the quite general proposition that the defense has again obtained a considerably

greater strength through the new weapons. This proposition is not to be accepted unconditionally, at any rate not in its entirety, because the new weapons increase the strength of the attacker in the same proportion as that of the defender. The defender had also the undisputed advantage with the oldest blunderbusses of being able to use his weapons more steadily and effectively, when he was in a position prepared beforehand, or even intrenched, than the attacker who was more or less in motion. The same is evidently the case at the present time. But to what extent will the condition have changed when the weapons are approximately equal on both sides? In the preparation of the action, in the stationary fire fight, which is a characteristic feature of the present action, finally, in the rapid fire, which is made to precede the decisive assault, the prospects of the attacker are just the same as formerly. The new weapon will give to the defender a continued greater superiority, if the attacker does not understand how to use his own weapon, or if he attacks unskillfully. As manifestations of unskillfulness may be mentioned, first of all, faulty formations; then a defective use of the ground and insufficient fire preparation. It is also natural to include in the proper use of the ground, in a negative sense, the avoidance of open ground for the attack when other roads and fields of attack are at disposal.

But there is at any rate one condition which must not be left out of consideration, and that is the time during which the attacker advances without firing, whether it be to the last assault or for making the so-called rushes, or, finally, to bring forward reinforcements. Here the rapidity of the fire and the flat trajectory exact their right and produce in a short time enormous losses, which have a shattering effect, to which I have always called attention. The art of attacking will now consist in not firing prematurely, even if the same effect as that of the defender can not be obtained.

The superiority of the defender's fire at this moment can never be fully compensated for, provided the defender still holds out or is present. There is nevertheless a means, unjustly scorned, for weakening the effect of the defender's fire as much as possible in the last stages of the attack, and not remaining defenseless oneself.^a

^a I will establish my opinion more firmly in the proper place.

But we oppose quite determinedly the opinion advanced that the proper means is found in the application of the rules for fortress warfare to field warfare, in order to compensate for the ostensibly acquired superiority of the defense.

It has been desired to show the possibility of working with intrenching tools toward the enemy's position during the night, by means of examples from the maneuvers. Yes; much can be proved by maneuvers. In the examples cited, the task of intrenching at about 450 meters from the enemy's position is really performed wonderfully well.

But I ask: "Where is the enemy who is so accommodating in war? Where is the enemy who would not have posts and patrols at a few hundred meters in front of his position, who would not at once attempt, on receiving their report, to drive away the workmen with volleys or rapid fire and by means of a sortie? To be sure, if it is supposed that the defender has inclosed his position with wire entanglements in such a manner that he can move out therefrom in a narrow front only, he has indeed prepared himself for a passive defense and can keep the enemy away with fire only. The details of field warfare are, however, different from those of fortress warfare. The besieged is, in the first place, not able to disturb the besieger, when the first infantry position is constructed—which will, however, not be situated at 450 meters, but between 800 and 1,000 meters—to the same extent by a sortie on an extended front, as a sensible defender who has not condemned himself can do effectively, because the defender of a fortress must certainly traverse, to a greater or smaller extent, a defile when he sallies out. But if the besieger succeeds in approaching to 450 meters to throw up the second infantry position, the front of the fortress in question must be so shattered that nothing much can any longer be expected from it.

These proceedings can therefore not be applied to field warfare as methods to be used everywhere, and we believe that we have established our plainly expressed opinion that intrenching at this distance in front of the hostile position will only lead to resultless, exhausting night fighting and will make part of the troops useless for the next day.

I do not know whether an advocate of such a method has ever led, in fortress warfare, working parties beyond the line occupied by us, in order to undertake intrenching, etc. I

have been there and have seen how difficult it is to keep order in the dark, to prevent a panic or confront it. All such considerations disappear naturally in a maneuver.

It is naturally something different to strengthen the captured points of support at a greater distance from the enemy during the night or even during the day, in order to insure oneself against a counter attack, or to obtain a specially secure artillery position; but to recommend such a siege method in field warfare as the general means for overcoming the difficulties of the attack appears to me to be a great mistake.

The recommendations which the present regulations make (p. 119), concerning the use of night operations, do not at all apply to such a siege method, but only to the advance to the edge of the hostile dangerous zone, and thus to the advancing of the troops while it is still dark, "so that," say the regulations, "the fire may begin toward morning." An attack must therefore be dealt with approximately as at Laon on Hochkirch.

This is, in brief, a description of the expressed opinions concerning tactics as they have appeared during the last ten years, and the state of the infantry fighting methods. The Boer war is supposed to have brought about changes in tactics.

Let us first consider the general conditions and some results thereof.

II. GENERAL CONSIDERATIONS OF THE FIRST PART OF THE BOER WAR—THE ARMIES AND THE THEATER OF OPERATIONS.

The idea predominating in the strategy of a campaign will also manifest itself in its tactics. Yet it must do so forcibly, otherwise there will come to light in the whole conduct of the campaign a hidden inconsistency which can never lead to any result. This therefore means: If I intend to carry on the war offensively, I must seek the hostile army in order to attack and defeat it. The tactical operations will therefore, as a rule, also be offensive, and the tactical attack must therefore be made. Before 1866 the idea had also arisen in us, and was even defended by Moltke, that, assuming a strategical offensive, while relying on the superiority of the needle gun, we could fight on the defensive. We advance, take up a posi-

tion, let the enemy assault it, and repulse him completely. Marshal Niel also had similar ideas before 1870. The results belied these ideas altogether. The Prussian troops were, in 1866, always on the tactical offensive. There were, of course, a few exceptions, and the reason that the thoughtlessly advancing adversary was received standing with rapid fire and not met with cold steel on the battlefield was found in the sound leading of single organizations.

It is exceptionally rare to see only defensive action in a defense, and in an attack of greater proportions only offensive action. When the defender confines himself to a passive defense only, this is in itself a sign of weakness. The skill of the subordinate leader is principally shown by his being able to alternate with attack and defense at the right time in the excitement of battle. This will manifest itself especially in encounters.

The Boers assumed the strategical offensive in Natal, but they did not take the tactical offensive in a single great action. They took up a position, repulsed the attack effectively, but did not follow up the advantage, and thus did not make it decisive.

Joubert's advance in the direction of Pietermaritzburg led to no result. No attack was chanced.

Some would nevertheless perceive, first of all, in this conduct (which can be explained only by the lack of a thorough strategical idea, namely, to utilize fully the original numerical superiority in one direction with concentrated forces)—some would, we say, perceive in the conduct of the Boers a new active embodiment of the idea: Strategical offensive, tactical defensive.

The progress of the war has shown sufficiently well the impossibility of this method. The strategical advance came to a standstill, and the Boers also found themselves thrown on the strategical defensive, in which they finally had to succumb to the continually increasing force of the world power.

This was the situation as it appeared to the attentive observer at the change of the year 1899 to 1900.

Did, now, the commanders of the Boer army act absolutely incorrectly on this account? Such assertion is far from me. If they had the conviction that their troops were not fit for the great tactical offensive, that insufficient discipline and

other moral shortcomings would have let the attack be shattered under the fire of the English quickloader and guns, then the method adopted was certainly the one left to them. We shall perhaps obtain more accurate information thereof from a book which one of the leading Boer generals is engaged in writing.

A Bonaparte certainly, a Frederick perhaps, would have been prepared to fight a decisive battle with these masses and a force concentrated at one point, whether operating against Durban or Cape Town, and to teach his soldiers the offensive in the siege; but Joubert was not exactly a Bonaparte.

We desire at any rate to assert that this idea has as a matter of fact met with disaster in this war also, and that an energetic, rapid, strategical offensive can not be controlled, so much the less, as it is never certain that our adversary will do us the favor of attacking us in our fine position.

In the first period of the war, from October, 1899, until the appearance of Lord Roberts, the defective strategy of the Boers against the many times unskillful tactical attacks of the English certainly did not exert any influence.

There are now very few radical differences in the formations and fighting methods of the infantry of the large armies. It is true that the German regulations of 1888 have had a strong influence on all regulations, also on the English, because the incomparable war experiences of 1870-71, from which were evolved, although seventeen years later, our regulations, had raised our military reputation to the highest pitch among all nations, even among our enemies.

There was nevertheless considerable difference between the English and German attack at that time. The former leaves the carrying through of the fire fight almost entirely to the first line, and the second line first comes into action in the last decisive act. If a third line is at hand, it also remains in rear in order to cover a possible retreat or to begin the pursuit. The deployment of skirmishers is to be as strong as possible, and the extent of front is not to exceed that of the attacking organization in line.

The advance is to take place as rapidly as possible, the bayonet attack being the main consideration. The distance of 450 meters is designated as that at which effective fire is to begin. The second line follows at about 720 meters. As

soon as the enemy's fire becomes much felt, the advance is to be by rushes; the volley is especially recommended; magazine fire will first be used immediately before the assault.

The German regulations, on the other hand, emphasize the fact that the deployment of skirmishers is to be sparse in trying to establish contact—that is to say, in the first preparation. But as soon as the decision is sought, strong swarms will be deployed at once and gradually reenforced by the second line. (Part II, 24.) The distances for lines in rear are not prescribed; the distances of the *échelons* should be such that these can not be hit by one shrapnel cone.

Skirmish fire is declared to be the principal fighting method under all conditions. With us the middle ranges lie between 600 and 1,000 meters. We can, therefore, as a rule, open fire at a longer range than the English infantry.

These were, perhaps, at that time the principal differences in the regulations between the two infantries in carrying through an attack.

It is seen that the German regulations show more points in common with the Boer fighting method than those of the English. But the English had been spoiled through campaigns against savage or half-civilized people, whose attacks they had repulsed easily.

It is well known that the training of the English infantry in utilizing ground and in shooting did not amount to much. The English officers belong to the educated classes and their heroism is undoubted, but their technical and practical military training leaves much to be desired.

A good training of leaders and men in dispersed fighting can be accomplished through exercises and field maneuvers only on varied ground, and not through exercises in large camps. The English, whose laws do not permit their going on to pieces of ground which are private property, were, at the outbreak of the war, in the same position as the French before 1870, who had also carried on routinary maneuvers only in the camp at Châlons.

The English army is in every way an army of volunteers, and the personnel contains many indifferent elements, but it is ever a national volunteer army, and the troops have the consciousness of belonging to the great British Empire, to that race which by its strength and tenacity has subjected

several hundred millions of other races, and holds them in submission. It is so much the more remarkable that so many weak spots have come to light in the course of the war.

Opposed to them was quite a peculiar army. A modern militia army, as it has been fondly called by the democratic militia friends, it was not, but it was a levy of all, in any way liable to service, and that of a people who differ extremely in physical and moral qualities from the nations inhabiting Europe. The older generation had obtained experience in fighting with the English, the younger in fights with native tribes, and had through these experiences, but more especially by hunting, developed into excellent shots. Steeled by work and exertion, the Boers also particularly excelled in eyesight.

Their religious bent, of a somewhat Puritan tinge, gave to them the fatalistic belief that God would not abandon a just cause. Toward the English they felt as the victors of 1880, and they treated the natives with the consciousness of a ruling people. However, man remains man everywhere, and no army which desires to fulfill all requirements can lack a strong organization and strict discipline. This has shown itself in the case of the Boers. Not every man left the camp for the trenches when the English advanced. Often enough whole crowds left the camp to go home to work in their fields. The conduct of the Boers reminds one of that in Vendée. Their organization was faulty in the extreme. The "commandos" were of different strength, commanded by a field cornet chosen by themselves. Greater units under permanent commanders were not provided for in their organization.

Nearly all being mounted, the Boers had nothing to suffer from the exertions of the infantry soldier on marches in the burning sun. They were not only able to quickly evacuate a position and to rapidly reach one in rear, but also to frustrate the turning and enveloping movements of their adversary by rapid extensions of their line of defense.

Not only was the individual Boer exceedingly skillful in taking advantage of the ground, as a result of his being accustomed to hunt, but the troops were also skilled in the construction of shelter trenches, etc., since the building of field fortifications is, on the whole, that part of military science which can, for the most part, be managed with good common sense.

Their defensive tactics had something in it of the methods of the natives with whom they had fought. They did not eschew yielding at one point to occupy a position lying in rear of it, in order to fall on the flanks of the pursuing enemy or subject him to a flank fire.

The Mauser rifle was superior to the English Lee-Enfield. The Boer artillery was considerably weaker in numbers, but a large part thereof consisted of rapid-fire guns, which were lacking altogether with the English. The Maxim-Nordenfeldt guns had even at that time shields similar to those now carried by the French field artillery, and are said to have proved quite efficacious against shrapnel and rifle fire.^a

The peculiarities of the African theater of war have been described often enough in numerous works: Enormous extent, large plains and steppes, steep mountain formations with isolated tops (kopjes) jutting out, which offered excellent cover and firing positions, the slopes covered with boulders; few trees and little water; few villages, consequently few auxiliary sources. These are, in brief, the characteristic features of that theater of war.

From this is seen how it and all the conditions there differ from the European theaters of war, on which our wars took place, and we emphasize here this great difference, because it must also be especially taken into account when considering the tactical conditions.

III. CONSIDERATION OF SOME ACTIONS OF THE BOER WAR.

GENERAL SITUATION IN THE MIDDLE OF OCTOBER, 1899.^b

The principal force of the Boers under General Joubert advanced in several columns, crossing the frontier mountains into Natal, and pushed forward concentrated against the English camps at Glencoe and Ladysmith. The strength of the Boers was about 20,000 men; that of the English at both points, 9,000 men altogether, with about 3,000 men at Durban and Pietermaritzburg.

^a For particulars see Lindenau, "Supplement to the Militär-Wochenblatt," 3d part, 1902.

^b The strategical situation is only given in so far as it has an influence on the tactical decision.

About 12,000 Boers under Cronje were used against Mafeking and Kimberly (western theater of operations). A weak southern army had penetrated into the northern part of Cape Colony.

DUNDEE, OCTOBER 20, 1899.

The camp at Glencoe was fired upon on October 20 by 5 guns on the Petersmith Hill at Dundee. The Boers had occupied this hill with 900 men under Lucas Meyer. The columns advancing to the right and left of him were still in rear. General Simmons, whose detachment was 3,500 men strong, let his 20 guns open fire and decided to take Petersmith Hill.

The action shows us first of all a repeated assault of 3 English battalions on the high position of the Boers. The attacks were repulsed. Then came the reenforcement of the English with 4 companies in front, and the launching of a flank attack with 4 other companies, a detachment of mounted infantry, and the Eighteenth Hussar Regiment. The English did not wait for this flank attack, but advanced anew in front. For all that, only the flank attack was decided in favor of the English. But they lost 224 dead and wounded, among them 32 officers, that is to say, $6\frac{1}{2}$ per cent of 3,500 men. The Boers had only 10 dead and 66 wounded. One gun remained standing.^a

The only thing remarkable about this loss is the proportion of officers to men. Otherwise it must even be regarded as small, considering the repeated frontal attacks of the English. The Boer position was situated on steep hills, which diminish the effect of grazing fire.

The artillery fire preparation—20 guns against 5—compelled the Boers to draw back their guns.

But the position of General Yule, who had taken the command in the place of General Simmons, who had fallen, had become untenable, since Joubert's columns threatened to hem him in.

In order to make his retreat to Ladysmith possible, General White, commander in chief in Natal, who was in this provisionally fortified place, decided to clear the line of retreat for Yule by means of an advance on Elandslaagte.

^a The English lost, according to other accounts, 600 men, and the Boers 100 out of 900. That would be $17\frac{1}{2}$ per cent on the side of the English—consequently still a reasonable loss.

THE ACTION AT ELANDSLAAGTE, OCTOBER 21, 1899.

Gen. Jan Kock had occupied with 800 Boers (including the German Volunteer Corps and 2 guns) the rocky heights north-west of Elandslaagte.^a

General French was given the task of taking the position with 3½ battalions, 11 squadrons, and 3 batteries. He made very correct dispositions. While the artillery deployed in front of the enemy's position at half past 4 in the afternoon and 1 battalion attacked in this direction, 2 battalions tried to turn the left flank of the Boers. Several squadrons, making a detour to the right, accompanied this movement, while 2 other squadrons went around the right flank of the Boers.

The English artillery fire compelled the Boers to withdraw their guns which were, however, brought forward again and came into action at different times during the infantry fight.

The English infantry rushed forward against their adversary with the greatest contempt for death, in front and on the flank, from terrace to terrace on the steep slopes, bravely supported by the artillery, which approached at a gallop to within 1,800 meters of the enemy's position. A short attack of mounted Boers on the English right flank was repulsed.

The infantry attack came to a standstill at 100 meters from the crest, but at the signal for the charge all put themselves in motion. The height was reached and the position taken, which had been gloriously defended by 800 Boers and Germans. The English cavalry attacked at the same time and completed the victory.^b

Loss of the English, 36 officers and 238 men dead and wounded. Of the Boers, 450 dead, wounded, and captured. The commander, Kock, was mortally wounded. Colonel Schiel, commander of the German volunteers, was wounded and captured. Count Zeppelin was killed.

It is seen from both these actions that the flank attack was not at all unknown to the English, and that General French

^aTo these are to be added, according to some accounts, about 900 Orange Colony Boers with 2 Maxims. (See Gilbert, "The South African War.") Other accounts say nothing about this.

EDITOR'S NOTE.—According to the German General Staff History of the Boer War, the Boers gave their strength as 646 men and 2 guns.

^bI can not say whether this attack was made by the squadrons from the English right or left flank. (Note: From the English left flank.—EDITOR.)

used it, on the whole, skillfully. But they also demonstrate that the losses do not assume the frightful proportions at which the hands were raised in horror in our "bloodshy" time. The loss of officers was also unusually high at Elands-laagte.

We see that the English were victorious in both actions, but the Boers succeeded, by the skillfully executed concentric advance, with superior numbers, in shutting up the English corps, under General White, in Ladysmith, where Yule had arrived after a retreat involving extremely heavy losses, to repulse the attempts at breaking through and thus gain a strategical triumph. But it is also shown further that the best strategy can be entirely successful by means of the final tactical result only, and this did not fail at Ladysmith. The Boers were not able to take this place either by bombardment or assault.

BATTLE AT COLENZO, DECEMBER 15, 1899.^a

(See Pl. 1.)

English reenforcements (1 army corps) have arrived; they are distributed in the following manner: One strong division to Natal; 1 division under General Lord Methuen to the western theater of operations; 1 brigade and a part of the cavalry division under General Gatacre in the northern part of Cape Colony.

General Buller has assumed the chief command, but goes to Natal in order to take special command there.

There is no question but that a division of forces was caused by this distribution, which must have had an unfavorable influence on the tactical decision.

Buller had, at the end of November, 20,000 men at his disposal for operations in the field. The infantry consisted of the Second, Fourth, Fifth, and Sixth brigades, each of 4 battalions; the artillery of the First Brigade division of 3 batteries, the Second of 2, and 14 naval guns; 1 cavalry division of 3

^a Apart from a whole series of writings about the first part of the Boer war, Colonel von Lindenau has, in the third part of the *Militär Wochenblatt* for 1902, made some very pertinent observations on Colenso, Magersfontein, and Spion Kop, to which we are able to refer several times. We can therefore be so much more brief.

regiments, 2 independent squadrons, and a detachment of mounted infantry, besides 1 company of pioneers.

In order to relieve Ladysmith, Buller had to attack and defeat the Boers, who were intrenched at Colenso on the Tugela. He concentrated his troops for this purpose in a camp at Chieveley. On December 13 and 14, 8 naval guns bombarded the position of the Boers, north of Colenso, who did not reply.

Colenso lies only 13 kilometers from Ladysmith. If the Boers were defeated here, not only would Ladysmith be relieved, whose garrison showed itself very active in small sorties, but a very difficult retreat of all the Boer forces and loss of much material was to be expected by an energetic pursuit. The Boers had resolved to hold the position north of Colenso. This extended from the Red Hill to Fort Wylie. But Hlangwane Hill, which flanked the line at Fort Wylie, was also occupied. The shelter trenches were, for the most part, not constructed on the heights, but the most advanced at their base were close to the Tugela, with the rest in tiers. The so-called Fort Wylie was constructed of strong boulders.

The accounts still differ as to the Boer force.^a It does not seem to have exceeded 5,000 men and 5 guns.^b Joubert had fallen sick and Louis Botha had assumed the command.

Buller's order for the attack was somewhat long, according to our ideas, but I do not think that he prescribed too much when he directed both brigades in the first line to advance against the hills north of Colenso, after they had crossed the Tugela. On the other hand, exception must absolutely be taken to the fact that a purely frontal attack was intended, while a great part of the enemy's position could have been enfiladed—as Buller himself admits—by taking possession of Hlangwane Hill, situated on the right bank of the Tugela.

Instead of doing this, the order sent the Fifth Brigade, Hart, against Bridle Drift (ford); the Second, Hildyard, against the demolished bridge at Colenso; ordered the Fourth Brigade,

^aAccording to the German General Staff History of the Boer War, the Boers had approximately between 5,000 and 6,000 men, five light field guns, and three 4.7-inch howitzers.—EDITOR.

^bLindenau gives 3,000 men and 6 guns. Other writers make quite uncertain statements. Gilbert, *South African War*, puts it even at 10,000 men.

Lyttelton, to follow the first two and in the direction of a point between Bridle Drift and the railroad, so as to support either the Second or the Fifth Brigade. The Sixth Brigade was to protect the flank of the Second toward Hlangwane Hill, and, if necessary, to support the mounted brigade, which, with 1 battery, was to advance against the above-mentioned hill, and, if possible, take position thereon, in order to *enfilade the kopjes north of the railroad bridge*. Stronger forces would have been required for this.

The Second Field Artillery Brigade Division, besides six naval guns, were to follow the Fourth Brigade, the First Field Artillery Brigade Division was to advance east of the railroad and take up a position from which it could prepare the crossing of the Second Brigade. Six other naval guns were to follow it. One platoon of pioneers was attached to the Second Brigade and two were attached to the Fifth.

The order says nothing about these pioneer platoons having means for crossing the Tugela, but this may be assumed. To the dispositions already enumerated is to be added that the order prescribes only partially an artillery preparation proper of the attack. Instead of ordering the artillery into position against the decisive point or points by advancing a few covering infantry detachments, the Second Field Artillery Brigade Division is to *follow* the Fourth Brigade; only the two batteries of the First Brigade division are to take up a preparatory position.

The time for beginning the movement was between 3.30 and 4.30 in the morning.

A surprise was not possible, because the movements were fully perceived from the Boer position. Buller had, on the the other hand, no definite information as to his adversary's position.

THE EXECUTION.

The Fifth Brigade, General Hart, advanced in close, compact masses without advanced cavalry, point, or skirmishers, in the direction where Bridle Drift was supposed to lie. It received gun and rifle fire at 500 meters from the Tugela, and deployed unskillfully as a result of the surprise. The foremost battalion hastens to the Tugela, finds no ford and can not cross the

river, either because the Boers had dammed it or because the ford was situated in another place. The brigade commander now directs the three rear battalions more to the east in order to look for the ford, whereby they come into a bend of the Tugela and receive a murderous cross fire at a distance of a few hundred meters."

A useless fire fight, accompanied by many losses, naturally began, and Buller ordered the brigade to retreat. The foremost battalion could not, however, extricate itself, fought several hours, and a large part was captured.

The Second Brigade, Hildyard, only 3 battalions strong, had advanced against the bridge. If ever a difference has shown itself in the method of using troops in the same army, it was here. The brigade deployed at once strong skirmish lines, allowed even the support to follow in an extended line, and took possession of some farms at Colenso, wherein some parts of the Sixth Brigade, which had deployed against Hlangwane Hill, participated.

To this contributed the fire of the Third Field Artillery Brigade Division and the naval guns, which silenced the guns north of Colenso, and also Fort Wylie.

But at this moment the Fourteenth and Sixty-sixth field batteries, under Colonel Long, advance at a gallop and come into position on the right flank of the skirmish line of the Second Brigade. They were only 500 meters from the Tugela and came under an annihilating fire from the nearest shelter trenches, about 700 meters distant, which laid low the greater number of the men and teams. Ten guns could not be brought back and were taken possession of by the Boers after the retreat of the English.

This occurrence made the commander in chief abstain from any further attempt to force the passage.

An attempt of General Dundonald to advance with his battery and 1,000 mounted men against Hlangwane Hill was frustrated by the fire of the small detachments of the Boers that held it.

The order to retreat to the camp at Chieveley was issued at 10.30 in the forenoon. The Fourth Brigade protected the retreating troops.

^a Gilbert's "South African War" has it, on the other hand, that the brigade turned upstream.

The strength of the troops participating in the action amounted to 15,600 men,^a 44 guns, 14 of which were naval guns. Loss, 143 dead and 756 wounded; total, 899. This gives only a loss of 5.8 per cent; but in this are not included the missing, among whom were undoubtedly many dead. Estorff gives 70 officers and 1,040 men, of whom 28 officers and 203 men were missing or captured. Müller, on the other hand, gives 1,197 men and 66 officers, among whom 15 officers and 348 men captured. Gilbert, 1,300 men. On the whole, a loss of 900 men dead and wounded may therefore be assumed, which is, however, not quite 6 per cent for the whole corps.^b

But the Royal Dublin Fusileers lost, according to Lindenau, 23.9 per cent and the Connaught Rangers 16 per cent. As opposed to this, the Fusileer Battalion of the Guard lost, at St. Privat, 54 per cent, the First Battalion of the Fiftieth Regiment at Wörth, 43 per cent; the Sixteenth Regiment at Mars-la-Tour, 68 per cent, and the Fifty-second 52 per cent. Moreover, the regiments of the Guard division (first) at St. Privat and of the Tenth Division at Wörth lost on the average each as much as Buller's whole corps at Colenso.

These numbers speak volumes. They show that the effect of the newest rifles can not be so extremely severe, as is so often assumed from the data of the target ranges, and that the conclusions associated therewith are inaccurate.

The troop leading consisted only in the issuing of the order for the attack and in giving the order for the retreat. When the latter was given there were still intact 2 battalions of the Sixth Brigade and the whole of the Fourth. Consequently, the question may be pertinently asked whether these troops should not also have been used in the attack on Hlangwane Hill and thus have made it possible to repair the mistake made at the beginning.

We will not, however, give our opinion with absolute certainty, as to whether General Buller was right in ordering the retreat. It is a question whether he himself lost his presence of mind on account of the loss of a part of his artillery, or

^a According to Lindenau, *Militär-Wochenblatt*, 3d supplement, 1902.

^b The losses as given in the British official account were: Killed, 136 officers and men; wounded, 762; missing, 228. Total, killed, wounded, and missing, 1,126.—EDITOR.

whether he judged correctly the situation of the troops engaged and the Boers' power of resistance.

Above all was lacking careful inquiry and preparation. How can a properly planned advance be made against a fortified position without taking proper steps to cross water lying in front of it? We were undoubtedly in the same fix at Wörth, but Wörth was no planned battle.

In the advance of the infantry the enormous difference, as already mentioned, between the methods and formations used by the Second and Fifth Brigades is very striking; that of the Fifth violated the simplest elementary rules of tactics in such a manner that no words are to be wasted on it. The brigade would have been shattered even if it had had no river in its front.

The very same thing must be said of the advance of the First Artillery Brigade division into the skirmish line of the Second Brigade. To do this may be possible under conditions when the attack proceeds uninterruptedly, but in thus preparing the attack everything was done to make it miscarry. Both batteries should have come into position at a point situated much farther to the rear.

Under such leading the behavior of the troops must be appreciated so much the more.

The effect of the artillery was small against the mountain position, except in the instance cited. The conduct of the Boers was wonderful. Artillery and infantry fire was saved for comparatively short ranges. As the English gave way, detachments of Boers rushed forward and surrounded the English troops, which did not dare retreat from the ravines. But the numerical weakness of the Boers prohibited a real pursuit.

ACTION AT SPION KOP, JANUARY 23-24, 1900.

(See Pl. 2.)

Buller now wanted to effect the relief of Ladysmith by a flank march to the left and an attack on the right flank of the Boers on the Tugela. He made elaborate preparations therefor. Since the Boers had, however, pushed forward their outposts across the Tugela to the region of Springfield, the preparations of the English were discovered and the Boers made theirs to effect a strengthening of their right flank.

Buller had at his disposal a total of over 30,000 men, but allowed 1 brigade with 2 batteries to remain in front of Colenso to make a demonstration. All the other troops, 20,000 men, with 60 guns, advanced by the left flank in three echelons, but took 4-5 days to reach Springfield.

The order of battle was: The Tenth Brigade (Coke), directly under the commander in chief.

Warren's division: Fourth and Eleventh Brigades (Lyttelton and Woodgate).

Clery's division: Second and Fifth Brigades (Hildyard and Hart).

Cavalry: General Dundonald, 3 cavalry line regiments, besides mounted infantry, Imperial Light Horse, Natal Carbineers, and South African Light Horse.

Artillery: 8 naval guns, 9 batteries, one of which was a howitzer battery.

The Boers had retreated to their positions behind the great Tugela. The right bank slopes steeply down to the river. The left bank consists of abruptly rising craggy masses of mountains, of which Taba-Myama, Spion Kop, and Brakfontein are the most prominent. The Boer position extended at first from Spion Kop to Kranz-Kloof, and later on the right flank was extended to Taba-Myama. (Plate II.) Botha commanded about 4,000 men and 6 guns.

General Warren had been intrusted by Buller with the immediate direction of the operation. The general intention was to turn the right flank of the Boers and press forward to Ladysmith from Acton-Homes. Such plans would succeed only through promptness. The difficulties caused by the bad roads had frustrated any surprise on account of the slowness of the march. ^a

On the 15th of January Buller's headquarters was at Spear's Camp, south of Springfield. Lyttelton's brigade was directed toward Potgieter's Drift. Warren's division with its two brigades was to cross at Trichard's Drift and make a flank attack.

^aThe English line of communication, Gilbert rightly observes, was transferred from the railroad line Pietermaritzburg-Chieveley to the line of highroad Frère-Prätorius-Springfield farm. Instead of making the convoys secure on this line, Buller dragged along right behind him a provision train of 650 wagons, which required 5,000 oxen.

Lyttelton forded the swollen Tugela on January 16 and occupied One Tree Height, where he intrenched.

Warren likewise effected the intended crossing and occupied a few smaller heights on the left bank. The Boers had everywhere retreated to their mountain positions and opposed the crossing only. The cavalry under Dundonald, ascending boldly through the Venter Valley, had reached on the 18th of January a kopje in the vicinity of Acton-Homes and repulsed a detachment of Boers. He awaited the now momentarily expected appearance of Warren's division, but this did not come. Warren sent him the order several times to return to Trichard's Drift, because he believed that he could not bring up his provisions in proper time over the long road from Acton-Homes to Devdorp. According to other accounts, a position taken by the Boers at Devdorp was the reason why this turning movement had to be given up. Here again only the frontal attack remained to the English.

The attacks of Lyttelton and Warren on the positions from Brakfontein to Taba-Myama lasted from January 18 to 22, and were repulsed, notwithstanding the participation of Clery's division. The English captured a few heights everywhere, but were unable to advance against the principal position of the Boers. Their attack formations consisted of dense skirmish lines, with troops following in close order. The artillery, installed on isolated kopjes, was unable to do anything against the high, craggy positions of the Boers.

Buller therefore approved of Warren's proposal to take Spion Kop by a night attack.

This movement, executed by 3½ battalions of Woodgate's brigade, succeeded in gaining possession, with quite a small loss, at 3 o'clock in the morning of January 24, of the weakly occupied southwestern point of the triangular flat top of Spion Kop. The English evidently believed that they had possession of the whole mountain, because they intrenched at the southwestern point. But this was not so, because the flat top rises toward a transverse height, which lies about 600 meters from the English shelter trenches and covers the approach to the northern part of Spion Kop. Notwithstanding the darkness and a thick fog, it remains inexplicable that the English did not advance at least to the ridge crossing the top. Failure to do this resulted in severe punishment.

Botha immediately directed the fire of several heavy guns against Spion Kop, from Taba-Myama and other heights, and advanced in two columns of a few hundred men, followed by 2 Maxim guns, against the northern slope which was ascended undisturbed by the English. The English posts on the cross ridge were overthrown and the Maxims were brought up. The Boers advanced to the attack by groups, clinging in their usual manner to the ground strewn with boulders, but did not succeed in driving the English from the ground taken. On the other hand, the attempt of the English to gain more ground succeeded just as little.

Lyttelton, who had been charged with the advance against Brakfontein, had in the meantime attempted his attack. During this movement he received a request for reinforcements from the troops on Spion Kop, which he answered by dispatching two battalions. The Royal Rifles ascended the mountain from the east side, while the Scottish Rifles enveloped it from the south and west side. The first mentioned reached the summit of Spion Kop and threatened therefore the left flank of the Boers, but could extend no farther and made no progress; the Scotts pressed into the dense mass of the other troops without being able to add any weight in the balance, because the troops were extremely exhausted on account of lack of water and by their exertions, and were exposed continually to concentrated fire, closely packed, without space for deploying and without artillery. Altogether, $7\frac{1}{2}$ battalions were massed on Spion Kop. General Woodgate had fallen and the command devolved first upon Colonel Crofton, then upon General Coke, and finally upon Colonel Thornycroft. Warren had sent the first-mentioned orders by heliograph to hold out to the last, and had then *very late* ordered one mountain battery, naval guns, and working parties to proceed to the height, but it was too late. Thornycroft had issued the order for retreat at 8 o'clock. With this the new attempt at reinforcing was frustrated. The attempts made by Buller 8 days later to break through at Kranz-Kloof were likewise unsuccessful, and he retreated to the camp at Chieveley and Frère.

The English losses from January 23 to 24 amounted to 1,437 dead and wounded, or 7 per cent of all the troops that had been present on the battlefield. Gilbert gives a loss of only 1,150 men. If it is assumed that 1,000 men of this

number fall to the troops used on Spion Kop, which were 5,000 strong, the loss would amount to 20 per cent. But herein are not included the captured and missing. The first are said to have included several hundred men. According to Lindenau, the Royal Lancaster regiment lost 17 and the Lancashire Fusileers 17.2 per cent.

What, now, can be learned from this action in favor of new tactics? Very little, according to my opinion. The losses of the English at Spion Kop were certainly not small, but did not, by far, reach those of many German organizations at Wörth, Spicheren, Colombey, Vionville, Mars-la-Tour, Gravelotte, and in part at Sedan. But these losses were inflicted with a single-loader, whereas the Boers carried an excellent modern multi-loader. Even if the missing are excluded from the list, as Lindenau does, the total number lost would not at all reach ours and many of the French losses in 1870. Those of the Russians at Plevna also exceeded the losses of the English. I will not deny that the multi-loader has, in certain instances, obtained a shattering effect on account of its range and rapid fire (the flat trajectory has no influence in the mountains), but the verdict must, on the whole, be that the English attacks did not fail on account of the effect of modern weapons, but on account of the unfavorable ground and the conditions connected therewith, and, finally, on account of faulty direction of the fighting.

The aimless wandering about for several days, which caused attacks to be made at different points instead of making one principal attack with concentrated forces against a single point of the right flank of the Boers, is excusable on account of the lack of maps and information concerning the extent of the Boer position toward the west. But the continual fighting and cannonading contributed to the weakening of the strength and nerves of the troops. There are undoubtedly some men who, the longer the noise of the fight and the whistling of bullets continue, the more they become accustomed thereto, but the nerves of the majority will be shattered. Then the lack of concert and of energy in leading on the 24th of January, on which day everything should have been engaged, caused a considerable number of troops to remain inactive.^a Finally, the

^aLindenau, with whom we fully agree here, states 11½ battalions.

proper connection was lacking between the troops engaged and the commander of the attack, General Warren.

But we are also of the opinion that General Buller should have proceeded to Trichard's Drift on the 24th. Here he could have taken in the situation with his own eyes and personally asserted his authority. The principle which we especially maintain at present, that the commander in chief shall remain at a suitable point behind the fighting line, so as not to let himself be influenced by the impression of isolated incidents in the fighting, is on the whole correct, and is especially applicable to our large armies, but should not keep the commander in chief from proceeding to the decisive point, of course not in the first line, at especially critical moments.

If the principle of his remaining in rear was to be considered binding in all cases, it would be to renounce entirely the influence of the commander's personality on the subordinate leaders.

But what is especially noticeable in this action is the small effect of the English artillery, which had here 60 guns against 6. This may be a hint to us not to overestimate the power of the artillery, because, although great actions will not be fought on similar ground in Europe, similar phenomena may present themselves in mountainous countries.

The absence of smoke has also here been of decided importance, because information and observation of the fight have become much more difficult to the commander.

The English troops accomplished in those days of fighting everything that could be expected of good men. We must not underestimate the difficulties that confronted both the leaders and the men.

The Boer leaders showed fine skill in divining the intentions of their adversary and in their counter precautions. The tool did not fail, because the movements of the mounted Boer infantry were certainly executed rapidly. The offensive of the Boers at Spion Kop was skillfully executed, but with small forces, and although they did not succeed in driving the English down from Spion Kop, they caused them to evacuate it by means of their enveloping fire effect.

But this attack can not be taken as a proof of the general excellence of their methods, which were here imposed on them in due form by the ground.

The English troops had the Great and Little Tugela at their backs. A simple pressing forward of the Boers would have brought about a defeat. This did not take place on account of their lack of discipline, of understanding of the situation, and of energetic will power on the part of the superior leaders.

LORD METHUEN'S CAMPAIGN AGAINST KIMBERLEY.

To the western theater of operations was sent, from the reinforcements that had arrived, the first division, under Lieutenant-General Lord Methuen, with the object of relieving Kimberley and Mafeking. The complete division consisted of the First (Guards) Brigade, 4 battalions; the Third (Highlander) Brigade (Wauchope), 4 battalions; the Ninth Brigade (Pole-Carew), $3\frac{1}{2}$ battalions; besides 1 battalion of the Gordon Highlanders, 1 naval brigade of 1,500 men, one-half battalion of mounted infantry, 2 lancer regiments, 5 batteries, 1 naval gun, and 1 pioneer company with a balloon section. The total number amounted to about 12,000 men, but the following had not yet arrived: The Third Brigade, and of the Ninth $1\frac{1}{2}$ battalions was still lacking, as was also 1 battery, so that the total was reduced to about 9,000 men.

General Cronje commanded the Boers in the west; he left the siege of Kimberley and Mafeking to separate detachments, and decided to throw himself with his main force in front of General Methuen.

General Methuen, eager to advance, started with his still incompletely equipped force, on the 22d of November, from the camp at Orange River and advanced against Belmont. The country has here quite a different character from that on the Tugela. The theater of operations is on the whole hilly, from which rise isolated craggy kopjes, especially on the northern bank of the Modder River.

Cronje had pushed forward some detachments to delay the British advance as much as possible and determine their strength. He kept his main body back.

The actions fought with these detachments during the advance of the English are called Belmont and Gras Pan. They were characterized by this, that the weak Boer detachments awaited their adversary on intrenched hills and opened fire at short ranges; then, when threatened by superior forces

in front and flank, they threw themselves on their horses and made a stand at the next ridge, so that the English were compelled to make repeated attacks, which cost them very many men.

The English by no means forgot to threaten the flanks of their adversary in these fights, but they advanced, on the other hand, in the morning at Belmont, in closed masses without the necessary reconnaissance, and were fired into at short range. The Boers had only 600 men and 2 guns at Belmont and 1,500 men and 6 guns at Gras Pan. The English losses amounted to 500 men, quite considerable for advance-guard actions. The Boers in the meantime retreated to Riet River, the northern bank of which Cronje held with about 7,000 men and 10 guns.

ACTION AT RIET OR MODDER RIVER, NOVEMBER 28, 1899.

(See Pl. 3.)

Methuen halted in his advance on the 27th of November at Klockfontein, about 8 kilometers south of Modder River (see Sketch III). Modder River is the station at which the railroad crosses Riet River, west of the place where the Modder flows into the Riet. The rivers were swollen and they have a strong current, but can be forded in several places. The northern bank rises throughout above the southern, and the width varies from 250 to 300 meters. The railroad bridge had been destroyed. There is a dam at the confluence of the Modder and the Riet.

Contact with the Boers had been lost on the 27th of November. Methuen himself reconnoiters and discovers from the left bank of the Riet no trace of the Boers. Other reconnaissances had the same result. Incredible, but true!

Methuen, who had considered whether he ought not to march on Jacobsdal—which road Lord Roberts followed later—but afterwards decided on crossing the Riet directly, gives therefore only one march order. He wants to cross the Riet at Modder River station and then await the arrival of the Third Brigade which had been assigned to him.

But the intrenched line of the Boers extended from the Modder River Place to the point where the Riet makes a sharp bend from south to west. The guns were distributed in gun pits along this line.

The Boers had also thrown up shelter trenches on the south bank, which were partly concealed by the brush growing along the bank, and had marked the distances to the front. The retreat across the Riet River was secured as much as possible by means of rafts, ferries, and two fords at the Modder River station.

The position of the Boers thus formed a crescent into which ran squarely the English division that marched on the railroad station. The Orange Boers held the right flank, which extended from the Modder River station to the railroad, the Transvaalers the left.

Methuen's division began its advance at 4 o'clock in the morning. Its strength amounted to 9,000 men and 22 guns, inclusive of 4 naval guns, because it had received the day before, reinforcements of $1\frac{1}{2}$ battalions and 1 battery.

General Methuen was now very much surprised to receive fire from the left flank of the Boers. He deployed his artillery against it in the positions shown in the sketch. An ineffective artillery duel, lasting 2 hours, now began. The Boer artillery, with its superior material, held its position against the English. Still believing that he had only a rear guard in front of him, General Methuen ordered the infantry to attack, and the brigade of Guards advanced east, the Ninth Brigade west of the railroad, consequently right into the encircling crescent.

The Boers open their rifle fire first at 700 meters and inform the English of their position.

The brigade of Guards now turns against the left flank of the Boers and the Ninth against the right, so that the English fighting line formed an obtuse-angled triangle, which had its vertex at the railroad—one of the worst forms of attack that can be imagined, because both flanks would diverge more and more during the action.

We may be brief. For 4 hours the rifle fire reverberates on both sides and nowhere do the English succeed, notwithstanding their artillery supports them bravely by advancing, and although they arrive at a point as close as 500 to 600 meters to the intrenched and invisible enemy, whom they fight in vain with skirmish fire and with volleys. No order reached the first line, neither were the ambulances able to approach. A suffocating heat of 43° Celsius prevailed.

The smokeless powder makes it impossible for the English to discover the position of the Boers in the shelter trenches on the southern bank of the river. They fire continually at the heights on the northern bank.

An attempt made on the extreme right flank of the English to cross the Riet fails.

General Methuen now orders the right flank of the Boers to be attacked. A large part of his artillery concentrates its fire on the dam, and this time with tolerable success. The Ninth Brigade takes the kraal lying south of the river; one detachment crosses the river on the dam and intrenches itself on the northern bank. In the evening English skirmishers even force their way into some houses at Modder River.^a

The fact is that the Orange Boers posted here lost courage and wanted to quit the field in complete demoralization, so that Cronje was compelled to evacuate the whole position in the evening. Krüger's correspondence with Stein, in which he complains that many Boers had remained in camp, confirms the pusillanimous conduct of the Orange Boers. On account of this, Stein addressed a stinging rebuke to the burghers.

Although the English could consequently consider themselves as victors, they did not think of following up their partial success. Great exhaustion and an incorrect estimate of the situation seems to have contributed thereto. The English losses amounted to 24 officers and 462 men; that is to say, about $5\frac{2}{3}$ per cent.

I will state once more that there is no question of an enormous loss in the fighting, lasting nearly the whole day, and that notwithstanding the Mauser rifles of the Boers, notwithstanding their modern guns, and notwithstanding their skill in shooting. These lost about 100 men; according to others, 350.

That the action at Modder River was a Pyrrhus victory was evident, since Methuen placed his troops in a camp at Modder River Station for a rest of several days.

What may be said concerning Modder River follows to a large extent from our short account. The reconnaissance was miserable, and shows us that the cavalry and mounted

^a I follow here the work "The South African War," by Captain Gilbert. Other accounts (Estorff, Müller), speak only of the crossing of one small detachment at Modder River.

infantry were compelled to obtain information by dismounted fire action. When patrols ride forward and retreat again as soon as a shot is fired they do not exactly do enough nowadays.

The English did not perceive the retreat of the Boers, and contact was consequently not maintained after the action. We will not criticise this too harshly. How often has not the same error been committed?

BATTLE AT MAGERSFONTEIN, DECEMBER 11, 1899.

(See Pl. 4.)

During the rest in the camp at Modder River, Methuen's communications were threatened several times by the bold enterprises of the Boers. But since he now had the whole Third Brigade (Highlander) with him, and since, furthermore, 1 regiment of lancers, 1 horse battery, 4 mortars, and 1 naval gun had joined him, and he had a total force of 12,000 men and 23 guns,^a he determined to advance against the position which Cronje had taken up after his retreat from Riet River.

The Boers, about 7,000 strong, with 13 guns, had taken position on the heights extending from the railroad in an easterly direction, but their position was extended, by means of shelter trenches, from the southeastern slope to Modder River. The guns were distributed along the heights, but the shelter trenches were thrown up not only on the heights, but also at their foot. Cronje had this time placed a reserve in close order behind his left flank (Sketch IV).

The reconnaissance of this position, lying so close to the English, was again defective as at Colenso and Riet River. Its terminating points had not at all been ascertained, and yet it must be inferred that the disposable cavalry and the mounted infantry, would have been sufficient to carry out such a reconnaissance, either on the road to Jacobsdal or in the direction of the railroad.

On December 9, Methuen ordered the Boer position bombarded with 1 naval gun. The Boers did not stir.

The division advanced on December 10, halted a few thousand meters in front of the position on the heights, and bom-

^a Gilbert, "South African War," gives 15,000, which seems much too large.

barded it for several hours with artillery, without the Boers answering, exactly as at Colenso.

Lord Methuen now determined to attack the left flank of the Boers. The Highland Brigade advanced during the night between the 10th and 11th, in close columns, without any scouts in front, in the direction of the southeast extremity of the enemy's position on the height, and along the road to Kimberley, fortunately crossed the wire entanglements, but received in the darkness, at 200 to 300 meters, such an annihilating fire that they recoiled, which is the modern military expression for running away, and could not again be brought to a stand until at 800 meters from the enemy. We believe that no troops led forward in that manner would have done any differently. Isolated attempts to advance again were soon given up. A terrific fire action now began.

When dawn came the artillery went into action, to which the Boers replied at first with a Maxim gun. But the English artillery did not succeed in subduing the hostile infantry fire.

Methuen now sent the Guards against the Boers' left flank, which extended clear to the Modder River. Three battalions were in the first line and one in reserve. These brave troops, who were inspired by the highest sense of honor and the most glorious traditions, sustained a fire fight lasting many hours and also reached the wire entanglements, but did not come to an assault. The English artillery advanced bravely to within 1,100 meters of the enemy without being able to shatter their power of resistance. The Ninth Brigade had taken up a position in support.

The Gordon Highlanders had been pushed forward to protect the line of artillery and support the Highland Brigade; they now attempted an attack, but were repulsed at the wire entanglements. On the other hand, a turning movement on the part of the Boers miscarried against the left wing of the Yorkshires, who had been sent to Brown Drift.

The Boers had, in the meantime, deployed their artillery against the Highland Brigade, had renewed their rifle fire, and had advanced against the brigade in small bodies, stealing skillfully across the ground according to their method. And now something happened which does not redound to the glory of the celebrated English troops, who had in the meantime been reenforced by the battalion of Gordon Highlanders. A

great many ran to the rear. They rallied behind the English artillery, which they left unprotected; but as a few shrapnel reached them they again continued their flight to the ambulances. As the Boers again made attempts to attack the left flank, Methuen gave up the fight as lost and let the retreat begin.

Three battalions of the Ninth Brigade and the Scotch Guards had really not been engaged.

The keeping back of the 3 battalions of the Ninth Brigade can only be explained in this manner—that Methuen feared an attack of a flying column on his train and wanted to use them to repulse it if this happened. A sufficient reason is, however, lacking for the nonemployment of the Scots and the mounted infantry. The losses amounted to 895 dead and wounded, or something over 7 per cent. Two battalions of Highlanders had lost, one 282 men, or 35 per cent, and the other 187, or 23.4 per cent.^a

These losses do not reach ours in the August battles, either in the total or as regards single organizations (see p. —). What right has one now to speak of the difference of effect between the *chassepot* and the multi-loader?

The losses of the Boers have been stated differently. The accounts vary between 200 and 600 men.

The night attack was planned and was to be directed against the left flank of the Boers, but since the reconnaissance was again utterly defective the attack did not strike the left flank, which extended clear to the Modder River. If the eastern edge of the heights had been taken, the other part of the Boer position could certainly not have been held.

We shall not presume to give an opinion as to whether Methuen would have done better to go off to the left, since the maps, heretofore furnished, vary much.

As the Highlanders advanced along the road to Kimberley

^a According to Lindenau. Müller gives the total loss of the Highland brigade as one-third of its officers, among whom was General Wauchope, and 725 men. Gilbert, "South African War," gives the total loss, including missing, as 971 men.

NOTE.—The German General Staff History (English edition) gives the British total losses as 68 officers and 903 men, or 7 per cent of the total strength and 13 per cent of the force actually engaged. The Boer losses are estimated at 250 killed and wounded, or 5 per cent of approximately 6,000 Boers in action.—EDITOR.

and the Guards were placed to the right of them, a purely frontal action developed, in which 12,000 English were not able to overcome 7,000 Boers. Only about 9,000 were, however, really engaged. The superior number of the English guns did not make itself felt at all, and the tactics, again used by the Boers, in not engaging their artillery in an action against superior numbers, seems to be a very admirable proceeding on the part of the defender. When one has engaged in an artillery duel and, getting the worst of it, wants to withdraw, it is too late. Then there will be a certain number of dismounted guns, and the whole force can no longer be used against the infantry attack or to support a sortie.

At Belmont and Magersfontein the night advance of the troops, who were to attack first in close masses, was certainly ordered with the intention, which is correct in itself, not to let the troops get out of hand in the night. But no night advance can ever be made entirely without scouts, which must certainly be only 50 to 60 paces from the front. Furthermore, several battalions must not advance in one compact mass, but with at least some distances and intervals. If it is intended to deploy after having received the first shots, as is said to have been the case here, it is certainly the worst procedure imaginable; the troops must without further delay throw themselves at a run on their adversary and run him down.^a Whether only and solely a picket is encountered is another question. What we have said of night attacks is fully confirmed by the panic of the Highlanders. The advance of the Boers on the right flank, which had such a bad influence on the Highlanders, was of no importance, but was well supported by the Boer artillery.

The English cavalry believed that it had no opportunity to interfere. If it had been used on the extreme flanks, it would certainly have found opportunity.

An energetic final thrust on the part of the Boers would have been able to annihilate the greater part of the English forces, but as at Spion Kop, it did not take place here.

Methuen retired unmolested to his camp, where he remained encircled by the enemy's commandos, and with his commu-

^a According to Gilbert's "South African War," the Highlanders were just about to deploy when they received the fire.

nications threatened, until the arrival of reinforcements and Lord Roberts, the new selected commander in chief.

The second period of the war begins with the assumption of command by Lord Roberts. Strategically this is characterized by the advance of the British main army under Roberts against Cronje's corps, its outflanking, pursuit, and capture, the relief of Kimberley and Mafeking in consequence thereof, the occupation of Bloemfontein, the further advance of the British northward, and the fall of Pretoria. In consequence thereof the relief of Ladysmith and the evacuation of Natal by the Boers were brought about and Buller's advance into Transvaal made possible.

The strategical movements of the English were conducted with consistency, deliberation, and determination.

Tactically the English advanced, in the actions that took place up to the time that Pretoria fell, in such a manner that they enveloped many times both flanks of the Boer positions and with cavalry. Their fronts were therefore often enormously extended, so that a European army would certainly have tried to penetrate, with concentrated forces, the thin lines in some place. There are certainly people who regard the victory as assured by a turning movement, but this will always depend on the strength of the lines making the turning movements and whether they are still capable of resisting a skillful and quick attack executed in the proper manner.

But Roberts would hardly have made use of this great extension of front without a very great numerical superiority, even against the Boers, whose lack of offensive power he certainly estimated correctly. Thus, much is allowable that would perhaps be severely punished under other conditions.

The defective strategical planning of the campaign by the Boer leaders, who undertook more than they could manage in the capture of Ladysmith with their main army, appeared in its proper light through the outcome of the second period.

The third period of the war was a protracted partisan warfare, which was carried on with the greatest skill on the part of the Boers. Consideration of its actions would be of no use for our present purpose, but it may be remarked that the Boers who remained with the colors had, for the most part, remedied the defects which they showed in the previous

periods of the war, namely, lack of discipline and offensive power. The commandos had been divided into companies, and these into sections by an order of September 4, 1900. The election of officers was abolished, and the nominations were made by the higher officers and confirmed by the President.

There was not much to see of the so-called Boer attack in these actions, but there were certainly sudden, bold advances, as at Tweefontein, December 24, 1901, which to some extent brings to mind the celebrated action at Majuba Hill in 1881. At Tweebosch, where Lord Methuen was wounded and captured, it was shown that cavalry (that of the Boers) is able, under certain conditions, to approach within a few hundred meters of firing infantry and that therefore every attack against infantry must not be condemned offhand.

The Boers had become weather hardened and tried soldiers in the protracted struggle. The English, on the other hand, who were at last compelled to call out 300,000 men against the smaller nation, had a large number of badly trained, inferior troops in Africa. The time-honored tenacity of the Anglo-Saxon race and its strong patriotism again showed themselves in this war, and the enormous difficulties which space and climate opposed to the English troops must not be forgotten.

But Delarey, De Wet, and Botha will be put down in history, not only as models of bold partisans but as models of heroic conduct.

IV. DEDUCTIONS FROM THE BOER WAR.

The first deduction which was made public, was the assertion that the Boer war demonstrates that the frontal attack is no longer practicable. It was promptly made by those who had already before adhered to this thesis. They believe that they see their opinion confirmed. The remarks which we have added to our short description of some of the actions prove that not only the most modern firearms, which were undoubtedly used for the first time between troops of the European race (the short and wholly localized Spanish-American campaign is of little consequence), caused the English attacks to be shattered; but that in this case also, a wrong direction of

the attack, defective leading, often not sufficient energy in carrying through the actions, routinary methods, unsuitable formations, the peculiar nature of the adversary, and the ground, played a great rôle.

It will not be denied that the effect of the Boer's rifle fire, through its range and rapidity, is to be acknowledged as a new factor which enters into play in many instances of the action. But we believe that we are not, on the whole, wrong in asserting that the decision would have been exactly the same in case a single-loader had been used, and that consequently new experiences can not always be obtained from the course of an action. We perceive the proof in the comparison, which has been made several times, of the losses of 1870 with those of the Boer war. Yes; it may be asserted that in some instances the issue of the action would not have been any different, even if the defender had carried a muzzle-loader. Then how often were the above-mentioned conditions of the ground, the leading, etc., the deciding ones? This is seen throughout the whole military history from the oldest time to the present.

Remember the struggles of the Tyrolese and the Vendéans, in which the character of the country played so great a part; the enormous losses of Frederick's troops at Prague, Kollin, and Torgau, those of the Guard at St. Privat, which were to a great extent attributable to the glaxis-like slope of the ground in front of that place, while the attack of the V Corps at Wörth had again great local difficulties to overcome (the Sauer, steep slopes, woods, and dense growth). Both frontal attacks gained ground first after the attack of the Saxons in the former place and that of the XI Corps in the latter had produced their effect. But should they have been omitted for this reason? Certainly not. A flank attack can after all be effective only when the enemy is held in front. But this can only be done by attacking resolutely, not through passive demonstration.

Although the combination of the front and flank attack must be regarded as the most desirable, it is, however, wrong simply to declare the frontal attack impossible, and the Boer war does not at all give a right thereto, even on account of the other numerous perceptible influences on the issue of the actions.

The mistakes, which the English have made in regard to formations, have already been sufficiently described by us and others.^a We must agree with those who assert that a great similarity existed between the English attacks and the method of attack seen many times on our drill grounds. But it is, however, not a fact that is to be forgotten that on the drill ground, which is in most cases a level stretch, the same procedure will always take place, just because the extraneous conditions for deviating from this sameness are lacking, or these must be created arbitrarily by suppositions which will often give quite unnatural representations.

Now, the representation on the drill ground shows the deployment of dense swarms, which, as we have already mentioned above, have long since been recognized as correct in principle (see p. 128). These dense lines, which were used by the English also, have undoubtedly often suffered great losses, especially when they came to a standstill at one point or another, whereby a profitable use of the weapons one way or another was prevented. But these are matters which can not be quite avoided with any other formation.

Finally, the fact that the losses of the English were smaller than those inflicted on us in August, 1870, with the single-loader, the *chassepot*, contradicts the assertion of the new experience concerning the impracticability of the frontal attack.

The second deduction was, that our attack tactics must be changed. This opinion is principally based on the repulse of the English attacks and not on the attacks of the Boers. But is it, on the whole, possible to speak of a Boer attack on a large scale? The instances in which the Boers took the offensive, apart from the third period of the war, are so rare that no type or radical principle can be discovered therein. It was a stealing toward the enemy, with excellent employment of the firearm and the tendency to shoot him out of his position. When did it happen? One single time, against the already badly shattered Highlander brigade at Magersfontein, in which case it can not be determined whether the advance of the Boers or their artillery fire was the most effective.

This advance of single men and small groups had already

^a By me in a series of articles in the *Tägliche Rundschau*, 1899-1900.

been employed in our "Waldersee method"^a long before our great wars. It disappeared to a great extent with the introduction of the breechloader, because it was seen that a sufficient fire effect was not obtained thereby. The instruction contained in it concerning a proper use of the ground was retained.

This is consequently nothing new in itself. We are quite strangely affected when we must listen to people who tell us that we have heretofore carried out our attacks with altogether unsuitable formations, with close-order shock tactics, etc. It sounds almost as if extended-order fighting were a new invention. But the German is always easily disposed to undervalue himself, and this undervaluation had already begun after the Franco-German war. The heavy losses, which must naturally occur in any attack, were many times attributed to the division into lines, which had nothing to do therewith, and in many cases to formations in close order where such formations were not at all used.

But it should, however, be acknowledged that we must examine the phenomena of the Boer war just as attentively as we turned to our benefit the experiences gained on other theaters of operations in our time of peace before 1864. In this case it should, however, be remarked that we then drew partly wrong conclusions. Thus, for instance, after the war of 1859, the so-called "zouave mania" held sway over us for a long time, which was first dampened by our very sensible regulations of 1861. This mania was called forth by the exaggerated accounts of the impetuosity then shown in the French assault.

Now, it is certainly correct that a careful army headquarters should carefully consider all the new phenomena, and embody their conclusions in regulations, under whatever name they may be known.

Nobody can guarantee that the right has always been thus arrived at. War experience alone is the proof. The best conducted maneuvers and the most careful firing practice can not make up for it. In this case it is certainly an important matter—as I have often asserted—not to put a one-sided value

^aCount Waldersee was an uncle of the Field Marshal and was Minister of War in the fifties.

on war experience, not to lay down this or that as a standard, because it has just been gone through, but take the average experience. But one thing remains always the same, viz, the impression of war on the minds and nerves of men.

The regulations of 1861—consequently issued without great war experience on our part—to be sure emphasized correctly the effect of the needle gun, on the supposition that the adversary would have a muzzle-loader. The correct details did not become apparent in 1866 against the mass assault of the Austrians, but became noticeable first in 1870. May this be a hint to us not to draw conclusions and introduce methods that rest more on an outward looking at matters than on the deep conception of war, and the knowledge of the factors which influence it. This reminder is so much the more appropriate as war experience disappears more and more from the army.

V. REMARKS ABOUT THE NEW PROVISIONAL REGULATIONS IN ENGLAND, AUSTRIA, AND FRANCE.

ENGLAND.

It seems expedient and just to consider briefly the new English regulations, which must certainly be the result of self-experienced war incidents. We shall emphasize some principal points of the paragraphs on fighting and mention first that the English battalion numbers 24 officers, 50 non-commissioned officers, and 1,016 men, and is divided into 8 companies, each of which is divided into 2 half companies.

Great value is placed upon the instruction of the individual in initiative, since the regulations dispense with strict formalities in leading bodies of troops in extended-order, having a strength of about that of our platoon.

In the mixing up of organizations, the men are to place themselves under the nearest officer or noncommissioned officer.

I had already earnestly recommended this in my *Tactical Deductions*, which appeared right after 1870-71, under the heading *Practice in Disorder*.

All instruction and deployment of skirmishers is to take place under cover. But how, when this is lacking?

The advance by rushes is to take place with as long rushes as possible, up to fully 90 meters (consequently the opposite of what has lately been declared practicable with us).

The rushes are to be made in small detachments and groups.

Scouts precede the attack at about 800 meters. The advance of the skirmishers is to take place in quick time as long as possible, creeping when necessary.

On covered ground and against a badly armed enemy the distances between echelons are to be 180 meters; on open ground, over 270 meters to prevent one shrapnel cone from striking several echelons. (Very routinary.) The fire of the attacker is to be as enfilading as possible, hence greater extension. At close ranges the firing line is to have a density of one man per yard (91 centimeters).

Extent of front of the units:

A company of 100 men, 90 to 360 meters.

A battalion of 800 men, 540 meters.

A brigade of 3,200 men, 1,080 meters (two battalions in the first line).

A brigade of 3,200 men, 1,600 meters (three battalions in the first line).

In the Franco-German war the extent of front was very variable; it may, however, be assumed that on open ground it did not exceed 1,000 meters for a brigade.

In the attack, a larger body of troops is to deceive the enemy by feints, hold him in front, and prepare a flank attack. (Not exactly new.) The demonstrating troops are to attack with thin skirmish lines. The reserves are to be kept far to the rear.

The passing from the march formation to the action is not greatly elaborated, and, according to my opinion, correctly so, since the orders needed therefor do not belong in the regulations.

While the troops deploy in the assembly formation the leader has gathered information and gives his orders to his subordinates. A base battalion and a point of attack are designated for every unit. (It will always be possible to find the latter.)

Signal flags will be used for communication between the different echelons.

All troops that are designated for the attack form: The fighting line, second line, and third line (main reserve).

The battalions divide into several echelons, as soon as the long-range fire of the adversary is felt. Consequently, in the

case of the present artillery fire effect, above 5,000 meters, the companies and half companies are extended into sections, and are groups of 25 men, or less on account of previous losses. The field is thus, at this moment, covered with fighting atoms.

A section or half company follows the scouts, with intervals of 5 paces between men.

The rest of the company follows at 270 meters in a skirmish line. The second line may also advance on open ground in several deployed lines. (Will give a fine fire from the rear.)

The formations in close order are to be resumed under cover.

The running or creeping skirmishers now try to work forward to the decisive firing position. (The firing line must, however, be made more dense, at this moment, otherwise an effective preparation can not very well be spoken of.)

The execution of the assault is not essentially different from our regulations.

As regards the defense, we shall only mention that the counter attack is recommended.

So much for the English.

AUSTRIA.

In the general rules which the new Austrian provisional regulations contain, on pages 160 to 167, there is also mentioned a greater extent of front within proper limits, but an extravagant tendency to avoid losses nowhere comes to light. Provision for special scouting by the skirmish line is not contained therein. The fire effect is, above all, to be developed to its fullest extent. There is no question of a deployment of the supports and rear lines. The advance is to continue uninterruptedly until the enemy's fire compels deployment.

The rushes—as is provided in the English regulations—are to be continued as long as possible. About the same provision, as in all other regulations, is provided for the execution of the assault.

To hold the enemy, in order to actually attack him in another place, the principle (contrary to the English regulations) is laid down to advance close and form strong skirmish lines (which seems correct to us).

There is therefore nothing to be seen in the Austrian provisional regulations as to the adoption for the attack of the characteristic features of the so-called Boer tactics.

FRANCE.

The same can not be said of the new French provisional regulations. They differ greatly from those preceding them and rest in many respects on the German regulations, especially as regards the leading of larger bodies of troops and the freedom of action to be given to the subordinate leaders. They permit the deployment of the battalion into sections and half sections at about 1,200 meters, in which case it is allowable to form the sections in four ranks, whereby they are more easily handled.

The skirmish line may, when found necessary, also make the rushes in groups (small fractions). The fire will be opened first when that of the adversary makes it compulsory. The distances at which the enemy's fire is to be answered lie between 700 and 400 meters. The reinforcements which mix up in the firing line, are, as a rule, to carry the skirmishers with them in the further advance.

One hundred and fifty meters is designated as the assaulting distance. At this moment the assaulting troops in close order are to be 260 to 300 meters from the skirmish line.

On the defensive the counterstroke is recommended. The regulations breathe on the whole the spirit of the most reckless offensive.

The complete rejection of the volley goes too far. The volley can not be dispensed with in night firing, and is also very useful against cavalry and in every kind of surprise.

VI. PRACTICAL RESULTS AND EXPERIMENTS IN GERMANY.

Different writings, and among others the *Lessons of the South African War* by Von François, the former governor of Southwest Africa, which appeared in 1900, and the *Military Considerations of the War in South Africa*, which appeared in 1901, had—apart from the considerations which had been woven into the works heretofore published in regard to this war—gradually brought the question of reform in the infantry attack to the experimental stage.

Lieutenant-Colonel Von Lindenau's lecture, which has been mentioned several times, has also contributed thereto.

But when the foregoing experiments have been based upon the assertion that the tactics of the German infantry is at this instant in a state of transition, as for instance, the work *The German infantry attack according to practical experiences on the Döberitz training ground at Berlin* does, a false basis is chosen. There is at most a question of some practical changes. To speak of radical changes is simply bosh. Such change took place in the same manner as the thick crowds of lansquenets changed gradually to the line tactics, as the column, combined with the skirmish fight, again gained the upper hand against this, as the battalion column disappeared as a fighting formation, and the company column, and finally the fighting in close order, with a few exceptions, gave place to the extended order method of fighting.

The extended-order method of fighting is taken up more than ever with the question whether the action is now to be begun in long, thin skirmish lines, or in single groups with great intervals between the men, filling up the skirmish line gradually.

But it happens so often that an official hint will, through too much zeal, produce such consequences as were perhaps not at all intended by the authorities.

If the bringing forward of the skirmishers toward the enemy with the smallest possible loss, and again the protection of the parts in close order from losses, are considered the essential part of the question, I answer forthwith that the essential part lies in quite another direction. It lies in the question: How can I generally bring the skirmishers forward and in what condition? I will of course not deny that the question of form is extremely important, but when the real essence is pushed aside and another substituted therefor a wrong road will be taken from the very first. The form can never decide. The condition of the troops does that.

Let us now examine in detail the attack as imagined by the advocates of innovations carried out this summer on the drill grounds, training grounds, and on the terrain, and also in larger maneuvers,—in which case we shall for the present consider the infantry only.

THE ATTACK.

(1) THE CONDUCT OF THE SKIRMISHERS.

On a large scale the reconnoitering is done by the cavalry and the general staff officers in advance. It is nevertheless necessary, before the troops proceed to the attack, that infantry patrols try to steal up, or, still better, around the enemy's position, in order to gain as much knowledge as possible as to the line where the hostile skirmishers are really lying down. Not a great deal will be learned by this, because the enemy will do the proper thing by throwing forward small detachments to make the approach difficult.

The deployment for action usually followed, in the practical experiments, at an enormous distance from the position which was supposed to be occupied, very often at 2,000 meters and more. It is self-evident that the battalions must be broken up earlier into smaller units (concerning this later), in the face of the long-range artillery fire.

When the position of the hostile firing line can not be determined through patrols, there are no objections to pushing forward a weak skirmish line, as our regulations (II, 22), also recommend, to feel ahead and discover the position, except that this deployment has, to a certain extent, the character of a reconnoissance in force; it is, however, exceedingly desirable to avoid it if it is at all possible to do so.

But the innovators now demand *for the purpose of the attack*, even from the beginning, a quite thin skirmish line, advancing in single groups, and on the maneuver grounds an interval of 6 to 10 paces between men is to be seen. I even read in one work 10 to 15 paces.

It should, however, be remarked that some want to form a thin skirmish line of this character for an attack over bare plains only; while others even want to use it on covered or broken ground. Let us assume open ground. Suppose now a group of 12 men, who advance with intervals of 10 paces, it has a front of 100 paces. Is that still a group? But even if only 7 paces are assumed there will still be a front of 77 paces.

We have recently seen expressions in a new work which describes it as pessimism to call attention to human weaknesses in this instance. But one need not be a pessimist to declare that there is no army in which every man is a hero, and that

human weaknesses are more easily overcome by keeping together, whether it be in swarm of skirmishes or in close-order formations, entirely aside from the fact that there can not at all be a question of *leading* such a group with a front of 100 paces. A platoon will, therefore, when it has five groups, have a front of between 400 and 500 paces.

No, our men showed, on the whole, in 1870-71, even under the fire of a superior rifle, that they were possessed of a magnificent warlike spirit; but they must not, in the future, on account of fear of losses, be placed in such situations as will diminish, to a great extent, the influence of the principal factor of the moral element—that of the officer and noncommissioned officer. This might prove extremely fatal in the case of reserve and landwehr organizations, as examples from 1866 and 1870-71 have shown.

The men are now to approach the enemy's position creeping, running, and stealing over the ground, singly or in groups. The group is now to close in, according to the ground, now again to extend more. I have, as regards the individual advance, my own opinion, which may easily be guessed from what has been said above. It is, however, most difficult of execution, even on open ground.

The closing together will be most easily effected, because, if there is, for example, a height or a depression visible from afar, the men will, while closing in obliquely toward the front, hurry to reach cover. The extending again would go less quickly, because it means real heroism to require the man, in leaving cover, which is already difficult in itself, to now separate himself from his comrades and, so to speak, "soar in the air" alone.

All such matters are quite nicely arranged in maneuvers, but it is not a "striking proof of the Boer attack," as amateur reporters on maneuvers write. A conclusive proof of the usefulness of an innovation, or any formation whatever, can certainly never be arrived at by means of maneuvers. But, then, neither should a conclusive proof be spoken of, and just where the psychological element is seen pushed into the background, the usefulness may be strongly doubted. It might be answered that the psychological importance will even disappear when the soldier sees that few losses occur. To this may be replied that the feeling of being compelled to advance

alone, without a support near at hand, without encouragement, will cause greater unsteadiness than would be the case on account of greater losses in the beginning, since the soldier will be less affected by losses when in company than when alone.

Moreover the number of the unsteady (we use this expression) will increase considerably in this widely extended line, which is worse than to suffer heavy losses through the enemy's bullets. The living who remain will often dishearten the comrades advancing from the rear, more than the brave dead.

It must seem a quite peculiar argument in favor of the employment of this weak attacking line, to assert that the enemy will often not fire on these extended groups at all. The defender will either push forward similar detachments against them into the ground in front of his position or will direct a mass fire on them for a short time; or, again, will drive them back by means of a small sortie and thus put a check on the attacker from the beginning. He will under no circumstances let this line approach close to himself.

Now, it is said that even a thin skirmish line would be able to repulse such an attack. This is certainly not believed. Yes, if the skirmish line lies behind a good cover, it is another matter, but even then such a weak line would probably be overwhelmed.

But the principal matter is that this weak line can produce no fire effect, or one much too small. This the innovators also admit, and the skirmish line is therefore to be strengthened as soon as possible. Weak and widely extended groups are likewise to push into this quite thin first line. But the reinforced line is still very weak. After the first reinforcement on open ground, altogether irrespective of the losses suffered, the men would be lying down at intervals of 5 to 6 paces, consequently still too scattered to deliver an effective fire against a covered defender. A reinforcing, repeated several times, is therefore necessary in order to bring the firing line up to the required density. Now, this is, in any case, a very slow procedure, and if it may be admitted that the first reinforcements, which advance so widely extended, will perhaps suffer smaller losses than a thicker line, so will this be equalized by the more frequent repetition of this movement.

It is asserted in one work that if this method is slow it

matters little, because "*there is plenty of time in war.*" This is certainly a remarkable equalization of war. The Saxons at Saint Privat, the Second Army at Königgrätz, and the Prussians at Belle-Alliance did not at all have time to come to the assistance of those already fighting.

For all these reasons the immediate deployment of a moderately thick skirmish line, as heretofore, seems far more preferable. If it will suffer a few more losses than the quite thin one, it lessens, on the other hand, the enemy's fire and weakens it; then, when the human weaknesses of the attacker are pointed out, this must also be done in the case of the defender, who calmly delivers his fire against the thin line of groups that can harm him very little, but will always feel the fire of a denser line.

This deployment of weak forces and gradual reinforcement is, on a small scale, quite the same as the *droplike pushing-in of whole organizations on a large scale*, of which the action at Montebello, May 20, 1859, on the Austrian side, will always remain an unforgettable example.

Through the frequent reinforcing, a great mixing up of organizations takes place from the beginning. Now, I was one of the first, who, after 1870, advocated the practice of pushing reinforcements into a line, because very often nothing else can be done in an action, and I have also recommended the throwing in of whole platoons and, according to circumstances, larger units also, partly to replace unavoidable losses, partly to carry the firing line forward in a new rush in the crisis of the action; but I have never denied that it is better to mix up the organizations as little as possible, for which reason it may also be of advantage to leave greater intervals between the platoons and sections, when the ground permits, in order to keep these at least in the hands of their leaders. But by the method just described a mixing up will take place from the *beginning*, making more difficult the leading, which must, on account of the great extension, disappear altogether.

In the forties and fifties a section deployed, at a signal, as skirmishers in front of one-half of the battalion; other sections were pushed in little by little. Although it is a fact that the conditions are now different from then, we do, nevertheless, in this matter move within a *circulus vitiosus*.

When it is demanded in one work that a rearrangement is

to be made in the skirmish line, it is directly contrary to the fact that officers and noncommissioned officers are to lie down in action. How can the officer in this case effect a rearrangement? I should like to see it in the noise and the whistling of bullets in real action.

In this connection I will here finish with the lying down. When the officer has led his platoon and the noncommissioned officer his group into position, and has placed it there with a proper fire front and reasonably under cover, he may throw himself down and observe in that position the fire as well as he can, but as long as that is not yet the case he must lead and improve. But this he is not able to do lying down. He will be just as unprepared in the lying-down position to exercise the necessary influence when there is a question of rallying a retreating group; then he must even expose himself. But there is not always a Biehahn among the men. Who was Biehahn?^a

It is very proper that the officer should also lie down under cover during peace exercises, and not always be compelled to stand like a knight behind the platoon firing. But there are moments when he must influence his men by the example of special disregard of danger. But when the cringing is to be carried to the extent that—as one work recommends—the battalion commander, motioned to by the regimental commander, who is lying down on a hill, is to creep up the hill until he comes to the regimental commander, this can but make the very worst impression on troops who see or hear of it. Even in action we must not forget attitude and dignity.

We brought with us the advance by rushes from the war of 1870-71. That came entirely of itself. I was present, as the

^a Biehahn was a lance corporal in the company which I led into the field in 1870. Having penetrated into the Niederwald on the forenoon of August 6, my company was surprised by the onset of a detachment of Zouaves against my left flank. I made the line wheel to the left and repulsed the Zouaves, but a renewed onslaught made my men give way. While I made the left flank face to the front, Biehahn yelled out on the right: "Shame on you, you men. You leave the captain in the lurch." With that he stepped from cover and fired his shot.

This example had its effect, and the Zouaves were repulsed.

On the drill ground he would have been punished for leaving the cover. He was the first one in the company to receive the Iron Cross, even before his captain.

Fiftieth Regiment was the first to cross the Sauer and was compelled to traverse the 700 to 800 paces, wide meadows between Spachbach and Wörth, under the fire of the enemy, who was in position on the heights of the right bank of the Sauer. The detachments, that had first crossed the Sauer on hop poles, threw themselves down instinctively, rose up again and ran on, and tried in this manner to reach the Hagenau-er chaussée at the foot of the heights.

But since the action in the afternoon took place on the plateau farther to the front, against Elsasshausen and Fröschweiler, the advance by rushes ceased. The advance was made at the usual pace over open ground, even when a hot fire was received. The panting breast could no longer continue running; it was simply impossible. And this was the case in other places at the beginning of the action, in high corn and in deep plowed fields. And if we now begin the advance by rushes at enormous distances it can not be continued at the shorter ones.

Experience will show that it takes much time to get a long skirmish line to rise, that the running to the front of platoon and group leaders, the raising of the rifles, the loud commands, and the fixing of the bayonet draw the attention of the enemy and make it possible for him to turn his attention to the onward rushing skirmish line, which presents a large target.

For this reason, first of all, the group rushing must be small, because it gets up more quickly and presents a smaller target. Whether the first is correct may be very much doubted, especially in the first stage of the attack, because the group has a normal front of between 70 and 100 paces, and the commands of the leader can be heard with difficulty. In the second place, when the skirmish line is filled up, it will frequently no longer be a group; then the rearrangement is very difficult.

Lindenau believes that the body making the rush should not be smaller than a platoon. This may hold good, as a general rule, for level ground. It will naturally be modified on open ground, and the detachments may just as well be larger as smaller.

In the second place it is said that the rushes must not be too long, and they must be made at lightning speed.

I believe that no rule can really be laid down in this case. Opinions are very much divided concerning this. As we have seen, the English and Austrian provisional regulations prescribe as long rushes as possible. If we again assume level ground—because on hilly ground, etc., the rush, wherever it is possible, must reach the next cover of the ground—a rush of 60 to 70 meters does not seem too long. Only the rule can be given that a complete exhaustion of the men must be avoided. The rushes may be shorter the closer the enemy is approached, but who will prescribe a rule that applies exactly?

As regards the loud giving of commands, it is not impossible that they may be heard by the enemy in single instances, especially at short distances and in fire pauses, like those the Boers made use of to deceive the English. One of our coolest and best officers is also said to have heard distinctly, on the right flank at the battle of Vionville, the commands of the officers of the French Guard. This may be a very exceptional case.

On account of these experiences it is now advocated, even for the most violent fire fight, to lead by means of signals, in close formations as well as on the skirmish line. Is it then forgotten what influence a smart, calm command or a cheering word from the mouth of the captain or other superior has on the men? A smart "Up!" has quite another effect from the raising of the arm or sword. There are situations in which signals will be sufficient, and for this reason troops must be trained to the use thereof, but it is quite incorrect to attempt to forbid commands. The whistle is also more to be depended upon than signals.

The requirement that the next firing station be pointed out to the men before the rush, can likewise very seldom be complied with, since it can not at all be known whether a field of fire from the place lying in front, can be obtained. It is proper that the detachment making the rush should throw itself down, in order to get a breathing spell, behind any cover, although there may be no field of fire. This must be remedied as much as possible in the next rush.

In the work, *The German Infantry Attack*, we meet with the opinion that the group leaders (section and platoon leaders) must in the rush not be in front of their organizations

but in them. Here the apprehension that these superiors may be more easily shot down when they are in front is paramount. But herewith is abandoned the old, eternally true principle, that the officer must be, above all, on such occasions an example of bravery, and he must consequently be in front. The above proposition is well meant; it is desired to avoid the loss of leaders as much as possible, but it is a new denial of the moral motives that bring troops forward in war. No magazine rifle can alter this. When the troops do not fire, the officer must be in front of them as heretofore. The falling out of leaders through wounds and death must be compensated for as much as possible by the training of subordinate leaders in time of peace, and that not only among the noncommissioned officers, but also among the men. To be sure this has already been emphasized in our infantry for a long time, and there are a few Biebahns in every organization.

English officers say that their skirmish lines very soon dissolved themselves into isolated groups under the fire of the Boers. Do we now wish to elevate it to a principle?

The innovators further emphasize constantly that the rushes must be irregular in order to confuse and divide the attention of the defender. Such a thing will happen quite often of itself in the terrain. To lay down such a principle seems questionable.

It is furthermore expressly demanded that the unity of the attack be not impaired. We believe that this can at any rate be accomplished with more difficulty with thin skirmish lines and the group tactics, than by the methods used heretofore. If it is difficult to bring the isolated groups forward in this shallow formation, so will, on the other hand, on account of the great difficulty in the higher leading, the danger be easily increased of making unintentional isolated assaults, as, for instance, on July 3, 1866, from the Hola woods against the Austrian position.

If unity of attack is wanted, the means of the leaders for carrying it through should not be curtailed.

(2) THE BRINGING FORWARD OF REINFORCEMENTS AND OTHER TROOPS.

In my opinion the demands of the innovators give, in this case, occasion for greater objections than in the formation of the skirmish line. These demands are, as we have seen, not

at all new. They had already appeared after 1871 and found expression in the experiments of 1872, etc.^a

The thought always held paramount by me is: When it seems unavoidable to allow a mixing up of units to take place in the skirmish line; when, of necessity, we must, as much as possible, put up with all the disadvantages arising therefrom and give full play to the initiative of the lowest subordinate leaders and soldiers, it is so much the more necessary that the subdivisions following the skirmish line, the supports, second line, reserves, or whatever else we want to call them, be kept in close order and well in hand. *If this is not done there will no longer be any reenforcements or reserves.*

What is demanded? The rear lines are to give up the close-order formation, already at 1,200 to 1,400 meters from the enemy, and deploy into groups or thin skirmish lines. Open stretches are to be crossed in a mass. It is asserted that the losses from infantry fire will be small at this time. Why is the artillery fire left out of consideration in this case?

It must be admitted that if a company column once shows itself plainly to the enemy on open ground, a well-placed shrapnel, or the nucleus of the infantry fire, may scatter the company, but the captain or his successor brings it again together with his voice, when the men know that the advance is to be made just so and not in any other manner, as long as they are not in a skirmish line. A battle line of company columns (we very frequently use this expression, which has been tabooed without cause) presents somewhat larger targets, but has much greater intervals than the small groups, and the following line takes a considerable distance. On the other hand, by deploying the companies into groups, thin skirmish lines, etc., the whole field will be covered everywhere with small particles, and the deep cones of the artillery and rifle fire will cause us at least as great losses as the companies in close order will suffer, if not greater ones. But at present the companies are scattered out to a distance at which the influence of the captain can not make itself felt so effectively as is on the whole necessary, just as in the case of the supports and reserve companies—in a word, in the case of troops that are

^a See page 128. I have also shown the perniciousness of these demands in my "Considerations of Military Organization and the Conduct of War." (R. Eisenschmidt, 1897.)

to be thrown into the real action in good condition. This applies not only to the companies of the first line; it also applies to those of the second and third, and increases as the attack progresses, so that large units of troops, regiments, and brigades will soon find themselves in extremely bad condition for the real work of the action—which should certainly come first—and the higher leading must also consequently be impaired.

But deployed lines of units of troops in rear have still other great dangers. These have now increased still more since smokeless powder makes it more difficult than formerly to discover the adversary. I have described them in my “Considerations,” just mentioned, and know of nothing better than to repeat them here word for word. It is supposed that the supports follow the skirmish line in a deployed line.

“The skirmish line has suddenly disappeared in a depression. The next following line sees in the high corn no friendly troops in front of it. At this moment the hostile infantry opens fire on our skirmish line, but the cone of fire falls also partly into the open line following it. To the right and left fall dead and wounded. Some men believe that they see the enemy right before them; they throw the rifles to the shoulder and fire; a great part of the line follows suit. The bullets whistle away above the advancing skirmish line, which forthwith halts and throws itself down, and we may call it fortunate if it does nothing worse. The rest may be imagined. The carrying out of the attack will, at any rate, be quite difficult.

“I will be reproached with bringing forward unfavorable conditions in this case—yes, even with presupposing a lack of fire discipline on the part of the troops. There will always be some such men among the best troops. But will unfavorable conditions always be avoided, and will it be denied that practical formations would overcome these difficulties better and more easily? The highest feeling of duty and the best training may be wrecked on impractical formations.”

So much for my remarks in 1897.

The formation of section columns, now so often used and recommended on the maneuvering grounds, has different disadvantages under hostile fire. In the first place, it makes marching difficult on heavy ground (plowed field, corn). The

column becomes long, makes supervision difficult to the officer who marches ahead, and gives bad men an opportunity to slip away. And then the column is certainly not in readiness to fight in case of any kind of a surprise, unless the enemy advances perpendicularly to the flank, in which case front could be formed quickly by the turn or wheel. It is said to present a smaller target than the company column. But how great intervals can be taken between the single-section columns when large masses of troops advance? The distances can be small only. But when this is the case these section columns will then appear from afar as a compact mass, especially when the enemy is posted somewhat obliquely to them.

I have always called attention to the fact that a company line in two ranks presents a very large object. But we have for a long time been taught that it is above all important never to show deep objects, since the dispersion in depth of the shrapnel and rifle fire at long ranges will be especially dangerous to deep formations. The precept does, however, still hold good, and the section column is very deep.

As regards remaining in column of march as long as possible, which the supplement to paragraph 80, Part II, of our regulations recommends, in order to get as quickly as possible, by means of deflecting and turning, the heads of columns in the direction where the troops are to attack, it may be quite practicable under certain conditions, especially in encounter actions. A too long remaining in this formation leads in large bodies to the same disadvantages as I have before mentioned in case of the section column in smaller ones. This can not in this case be made a principle, but to assume the transition formation (the assembly formation) recommended by von Moltke, at the right time, must be the rule.

I found in the *Militär-Wochenblatt*, No. 80, 1902, an excellent article, which illustrates strikingly the breaking up of a company, which is to pass an open place under fire, advancing in deployed groups, following one another at 200 paces, and shows how the company will, in this case, slip from the hands of the company commander; this article likewise points out expressly the dangers of the above method, which is recommended so often.

All this can naturally be shown in quite a different light on the known ground of a maneuver terrain and in imaginative

literary sketches, and we should in the same manner be able to help the opposite opinion to its rights.

If we suppose a brigade formed by wings (2 regiments side by side—Trans.) advancing to the attack and that it has, for this purpose, taken such a formation at 2,000 meters from the enemy, that full freedom, as regards the formations, is to be left to the company commanders, and if we further assume that the reenforced skirmish line has come to within 400 to 500 meters of the enemy, then the brigade will be only a mass of particles which are distributed to a depth of about 1,000 meters over the whole field, whose leading is made difficult in the extreme and whose fighting power is impaired.

Quite another sight will present itself if, in this instance, three whole companies from each battalion are deployed in the skirmish line, followed by one company in close order, either in line or in column, and the rear lines make use of the same formation.

That this is impossible on account of the fire fight, is *not at all* shown by the fights of the Boers, since the great losses and the breaking down always took place at the closer ranges only. The Boers scarcely ever shot with their excellent rifles above 600 to 700 meters. It is just in this that they distinguished themselves.

Now, our field-service regulations certainly say very clearly that well-conducted infantry fire has a considerable effect on companies already between 1,500 and 1,000 meters; at 1,000 to 800 meters they are to halt temporarily or move laterally only when the fire of their own skirmishers is to a certain extent a match for the enemy; but at 800 meters they will be able to traverse the fire-swept space only by moving forward or backward, even behind strong skirmish lines.

These rules are laid down in order to counteract the non-observation of the effects of weapons in the maneuvers. That does not mean that they are to be a positive rule in war. Here quite other factors influence the manner of acting, above all the principle that losses must be endured, when the situation of the action requires it. But in order to justify the breaking up of troops into particles these directions are often referred to. I am, frankly stated, opposed to their incorporation in the field-service regulations, and should wish that the decision in such cases at a maneuver be left to the judg-

ment of the umpire. Every officer must, however, be informed as to the effect of the weapons, as far as that can be determined in peace, and must act accordingly. But in the maneuvers the absolutely imperative dictum, *Here I must hold out under fire, according to the situation of the action*, must have its place. But the Boer war has by no means confirmed this principle of the field-service regulations and the theories of long-range fire. They are indeed built up only on the percentages obtained in firing on the training grounds, and the old but always true idea not to believe these too much must always be kept alive. Since we now have no other measure for the fire effect, it must be reckoned with to a certain extent—no sensible person will gainsay that—but it can never be compared with results in the field and referred to about so: “There (in the field), only such and such percentages have been obtained; we have obtained more (on the training ground).”

(3) THE ASSAULT.

The Boer war has again confirmed the fact that the last act of the attack (the storm) is the most difficult part thereof, by which nothing new *per se* is said, to be sure. It has many times been verified by eyewitnesses that the assaulting troops first broke down right close to the defender.

The question at what distance the charge is to begin can never be quite settled. That is decided by the place. If we assume open ground, the last firing station will certainly not be more than 300 to 250 meters from the enemy, if the troops are to strike him with still some forces. The advocates of the innovations also want to push the detachments forward in close order, after the rapid fire has been delivered, and carry along with them the reenforced skirmish line. They believe that the scattered particles will then certainly come together; when they have come thus far, we press the attack and feel and understand that the assault is now to begin, since it is also advocated in this case to discontinue all loud shouting, and also the commands to fix bayonet and trumpet signals, in order not to draw the enemy's attention. Many also want to discard the beating of the drums.

All these propositions are contrary to the experiences of several thousand years, because at no time are the smart com-

mands, the trumpet signals, and beating drums more necessary than in this case. It should, however, be remarked that the drums will not be beaten when the reserves are able to maneuver unseen to the last cover. Then the drums are beaten first when the charge begins, because surprise is always an important consideration. But if the advance is over open ground, the drums are always beaten; this is and remains a powerful help. Because, which is the organ, through which the nerves are mostly affected in action and the human weakness influenced the worst? It is, above all, the ear: The falling of comrades on the right and left certainly exercises an influence, and when it becomes bad, it has a staggering influence on individuals and troops, but the ear becomes continually exasperated by the whistling and hissing, the dull thud of impact in the bodies of those hit and on the ground, the bursting of projectiles, and finally the crying of the wounded. There are men who harden themselves thereto, a few true warrior natures, to whom nothing matters on the whole, and others who become continually more nervous with the lapse of time. The sound of the drum is a help against this. Something else is heard besides the whistling and the whizzing—the old familiar *storm* march; the whole line begins to move of itself. And when it is said that the beating of drums notifies the enemy of our presence, the tap will, on the other hand, also have a disquieting influence on the weaker natures of the defender.

The assault is not to begin until the adversary is shaken, but as a matter of fact this can not always be discovered. Ceasing the defender's fire in order to deceive the attacker is one of the matters of the Boer war which is worthy of notice, although it has certainly been used earlier here and there, mostly by savage people, and a good deal of the fighting method of the natives remains in the Boer tactics.

Many in all earnestness advance the principle that no assault must, on the whole, be made on a position which is still occupied, but must be delayed until the adversary is "shot out" of it, until he leaves his position on account of our fire effect. This possibly happens now and then, only that it is improbable that the frontal fire will compel him to fall back. If this theory were always followed we might, to our shame and disgrace, be held at bay by a couple of dozen of skirmishers who deliver

a rapid fire. The enemy could then in the meantime retire leisurely without having to suffer from a fire pursuit.

No, we must preserve the power of being able to make an assault, and we believe that the Boer war teaches us in many instances that tarrying under fire brings greater losses than an assault. We must now repeat here the old truth that the defender, so far as he is still there, will during the attack aim leisurely at the attacker. The artillery will at this moment scarcely be able to fire any longer on the points of assault. Neither can the support of the bodies lying down on the flanks be effective for very long, because the line of advance of the attacking detachments will soon cross the line of fire of those who are lying down. Only in rare cases will it be different. It is therefore a question of eliminating the defenselessness of the assaulting troops, or at least of lessening it. Now, we have such a means, but we have set ourselves obstinately against it. *That is, the fire while in motion.*

I know that I appear in this matter like a prophet in the desert, but I ought not to be blamed when I here point to the fact that I have in an experience of 34 years as a writer said much which was at first scorned and later accepted as correct.

The opinion has now once more become rooted that firing while in motion is to be rejected, because there can be no question of accurate aiming in that case. We in return ask the advocates of long-range fire whether they believe that there is much of a question of aiming at 1,000 to 1,500 meters, and yet it is now used and vigorously defended.

Accurate shooting is the basis of our training, and there are situations in war where it would be used with great effect, especially on the defensive, but there are also situations in which the stress must be laid on the mass of projectiles. It is self-evident that it must be an aimed mass-fire, as far as aiming is possible at this moment. A good school training will not betray itself here either.

The fire while advancing has been much practiced in two army corps for about twelve years. It was begun at very long ranges and it was desired to advance against the enemy in this manner without stopping,—the so-called “fire or steam roller.” This was the most incorrect thing that could be done. The fire while moving can be used at short stretches in the assault only. It is a fact that it will not have the same effect as fire delivered from a lying-down position, or stand-

ing and kneeling, but the question may be asked whether the defender will shoot with the same calmness when the bullets fly around his head as thick as hail and stretch many a one down, as when he receives no fire at all. The magazine rifle with its clips is exactly suited to the introduction of this kind of fire.

Not only does the fire cover the defender with bullets, but it encourages the attacker just as much and more than the beating of the drums. The man no longer feels defenseless; he also does something to the enemy at this critical moment.

It is a mistake to believe that the men will not advance under fire. I have already several times referred to the attack of the First Turco regiment, which proceeded with full force in the village of Elsazhausen in the battle at Wörth, where I was present. What was possible for the French, we must certainly be capable of. We had formerly, as is well known, the "fire while in motion" as a companion of the column attack, when the skirmishers were taken into the intervals. The advance proceeded at charging gait; the men rushed forward a few paces, remained standing for a moment, fired their shot and advanced while loading, while other men rushed forward in their turn. This often took place by ranks and at the command of the platoon leader.

When the nature of the multi-loader is considered, it is indeed clear that a rolling mass-fire can be delivered also while moving. The disadvantage that the officers can not remain in front, will be compensated for by the advantage of keeping the enemy down. The supervision from the rear has also its good side. This kind of fire naturally needs more careful training and discipline, but this will always be easier to teach than a lightning springing up of the men for a rush forward.

In this manner the assault will be conducted up to about 30 to 40 meters from the enemy's position. Then follows the signal "Advance rapidly," at which the real charge, with hurrahs, follows.

Try this kind of fire while moving with troops that have been carefully trained on a target range, or, still better, in the terrain against targets placed there, and it will be seen that the results are not at all so bad. But the objects indicated will be attained, even though they be very mediocre.

In such a moment not only the bullets that hit, but also those that whistle past, are effective, and if a great number of bullets go over the skirmishers, they will make the ground lying in rear insecure for the reserves and supports.

We repeat that we do not believe that we have found in this a panacea for the success of the frontal attack, but certainly a means to weaken the power of the defensive in this most critical moment of the action. The leaders have the power of deciding when the use seems practicable and necessary. In training, it is before everything a question of making it understood and of impressing it on the man, that fire while moving is a "storm fire;" that it precludes the halting and taking position in every case. Let him be impressed with the principle: "*To go back under the fire of the breechloader means to die.*"

We shall not speak of the further procedure after a successful assault, since this has often enough been laid down in our regulations and in practice.

Every assault must go recklessly straight to the front. The flanks must, however, be protected as much as possible by troops that remain lying down or are kept back; as also the advancing echelons against the defender's counter attacks, which may be advantageously launched against the flank of the attacking troops. The adversary's counter attacks in front will certainly be made difficult through the fire while in motion. That the attacker, as soon as he perceives the defender's movement, halts and receives him with fire is self-evident. If the counter attack is repulsed, it is advisable to follow rapidly those that retreat, and, wherever possible, penetrate into the position at the same time as they.

VII. EXTENT OF FRONT AND BATTLE TACTICS.

The highest aim of leading in action is always unity. There is scarcely any difference of opinion as to the fact that it must now be attained by other means than formerly. Yet, when a radical upheaval is caused in the tactics of the principal arm, the leading will be made extremely difficult. The so-called Boer attack, which the Boers made very seldom, we have patched together from the unsuccessful attacks of the English and the very rare cases in which the Boers attacked, and the careful use of the ground, as was enjoined already in

the "Waldersee method." I will not deny that it is properly applicable to many situations in action, but this will be the case principally in detachment warfare, in which the encounter of smaller masses is presupposed. Now, many persons have asserted as early as 10 years ago that we are basing ourselves too much on the smaller maneuvers (in brigades and divisions) and have modeled our tactical methods too much according to the detachment warfare, and it has many times been held forth that we must train our infantry more as "battle infantry."

I have stated in my works that there is much exaggeration in this difference. I do not now hesitate to assert that the so-called Boer attack is not applicable in war as we must conduct it in Europe—that is to say, for battle in general. We have already pointed out sufficiently often in the course of our treatise the differences, proving this view, of the battling armies, the climate, and the country, and the evil consequences of the breaking up have indeed been taken into consideration, but there is here before everything a question of the *extension* which the line of battle must take when we adopt such infantry tactics. It is demanded that the authorized extension of the company be increased to 100–150 meters, that of the battalion to 400 meters. We will not, as has been done on occasions by other military writers, institute an exact calculation of the extension of an army's line of battle. To such an extent calculations do not, as a rule, agree with reality, and the argument may besides be advanced that the group attack is declared to be applicable to the open plain only, but that a battlefield of the present extent shows very varied features of ground.

But it must be taken into consideration, before everything, that by using the group attack, in which an interval from man to man of 10 and even 15 paces is to be allowed, the limit of 150 meters for the company will be exceeded. Single army corps will perhaps find open ground in front of them—as, for instance, the Guard at St. Privat. Let us suppose that an army corps is to proceed with the group attack over such ground and hold back for the present 1 brigade, whether on orders from the corps or proper division, and employs 3 for the attack; and it is probable that at first 4 battalions for each brigade form the firing line, or a total of 12 battalions, while 2 from each brigade, or 6 altogether, follow as reserves. This

will therefore give—while keeping back such strong bodies—an extent of 5,310 paces, or 4,946 meters. In this case 30 paces interval between battalions is assumed.

At Sedan the front of the Fifth Army Corps and that of the First Bavarian amounted to about 2,000 meters for each; that of the Guard Corps about as much. At Wörth that of the Fifth Corps, 2,100 meters; at Vionville that of the Third Corps and the Thirty-first Half Brigade, by deploying all the brigades under exceptional conditions, 5,000 meters; the Guard Corps, at Gravelotte-St. Privat partly mixed up with other organizations, about 4,000 meters; that of the Seventh Corps, roughly, 2,500 meters; of the Eighth Corps, 2,100 meters; of the Ninth Corps, 3,500 meters; the whole line of battle was, in the above-mentioned battle at 7 o'clock in the evening, in round numbers, 17,000 meters long, counting in the organizations on the extreme flanks.

Imagine the extent of front of still larger masses on the basis of the elementary splitting up in the group attack, even when it takes place only in part. We would be satisfied if it were probable that we would gain the victory by it, but our statements concerning the mixing up of units, the decreasing of the influence of the officers, makes the adoption of the group attack for large operations seem a serious danger. And we are, according to the expressions of many books and the conditions of many exercises, on the best road toward making a new routine thereof. The "Gentlemen, I want to see thin skirmish lines only" is said to have been heard often already on the training grounds.

These doubts have already been expressed by several war-experienced officers, because that which can not be learned in peace is the insight into the influences of the action on human nature and the weighing thereof. But the leader, also, is not at all free from these influences; in fact, he is, perhaps, exposed to them to a still greater extent, because on him rests the heaviest and most enormous responsibility. At the present there is a question of the existence or nonexistence of nations, at least of their position and future. Now, although modern leaders may be imagined as exercising their influence ever so far behind the line of battle, leading according to the map only and removed from personal danger, the leading will always remain difficult with so great an extension, in spite of

all the methods of modern times. And although he does not belong in the first line, the emergency will nevertheless not infrequently arise to compel him to proceed to a point where a crisis is taking place and make his personal influence felt there.

The lesson which all great leaders of all times teach us is, to keep back strong reserves for a decisive stroke. This lesson can not at all be set aside by the advance of separate columns for cooperation on the battlefield. The stroke of the reserve, with strong swarms of skirmishers in front, will be effective when the opposing forces have tired themselves out by fighting all day long. It is correct that they will be best employed for a turning movement, but their direct stroke in the evening of the day of battle is also quite conceivable. The fresh forces will cover the last stretch with a rolling fire while moving. But the forming and use of the reserves will be made difficult by an excessive extension.

Although the most careful training in the use of ground in small bodies and in the execution of the rush is correct, we must not lose sight of the requirement of moving large masses of skirmishers and the bodies following them. They must know how to keep the direction of the march without crowding or opening out, and still use the ground to the fullest extent. According to my opinion, not the group attack—which may be good under many conditions—but the training therein should occupy our attention the most. But to this belongs unqualifiedly the maintenance of the principle of maintaining contact. It is an old fact that all these things may be modified to a certain extent by the ground. For this we have sufficient intelligence and feeling of responsibility in our corps of officers.

If, therefore, the greatest extension of the company may be laid down as 150 meters, and that of the battalion as 400 meters for special cases, we can not join in the demand for more roomy spaces for more important situations—that is to say, *a greater extension*.

VIII.—INNER MOTIVES—THE USE OF FIRE—MEANS OF DEFENSE: TACTICS AND FORTIFICATIONS.

The innovators do not quite eliminate the disadvantages which the group attack carries with it, since they point out the fact that the moral qualities of the individual soldier must

not only be preserved by means of the most careful training, but must be amplified in sense of duty and honor, love for the reigning family and the fatherland, strict obedience, etc. All this has indeed already been required and striven for before. But we must here, of necessity, pass to a general theme, because the people and the army are inseparably connected. Why was the moral element so excellent in the army with which the great Emperor took the field? Because the patriotic and monarchical sentiments, the military spirit, and the strong sense of duty were still rooted in the people—strongly united by the education of the general liability to service, which had been in force for half a hundred years, and of a public school, the effect of which was certainly estimated too high, but which usually worked into the hands of the army. On what account were the Roman armies feared so much at the height of their power? On account of the strict discipline in the State, founded on the discipline of the home, where the father of the family ruled almost absolutely. This was the source of Roman discipline when the State was at the zenith of its power, and this reciprocity between the people and the army must exist at all times. The general liability to service is useful only on condition that the foundation of authority in State and family and the warlike spirit of the people—to be distinguished from the Chauvinistic, to be sure—remain unshaken.

Are we still situated in this respect as under the great Emperor? The greatest optimist will certainly not be able to answer this in the affirmative. So much is always said in regard to the influence of the press, but in this respect no importance at all is attributed to it. Several million copies of the social democratic papers are now distributed daily in Germany. They do their best to change the facts to suit themselves; to disparage our reigning family and the reigning families of other German states; to abuse in their graves our greatest men, above all the venerable great Emperor and Bismarck; to defame the corps of officers, undermine the love for the army and heroism, and, in league with the ever enduring "peace men" and "women," characterize war as a crime and the preparation of the fatherland as a devouring "Moloch."

A too far-going humanitarian tendency in lawgiving and in that public opinion which sees in crime a disease only, the un-

sound sympathy for the criminal connected therewith, and finally the influence resulting from the virtual emancipation of quite young people from parental restraint on account of early employment in factories, contribute to undermine the sound idea of authority.

But it is really not believed that all this must finally undermine that spirit which fought our battles, and that the army can not undo all this in a short time of service. To train men who are permeated by such poison to become such steady soldiers as the dangers of the group attack demand, would be quite difficult.

There is still a redeeming feature at a time in which the conditions of army discipline seem to be in a state of decay among the people, namely, that the successor of so many great monarchs remains true to the traditions that become a soldier, and that the other German princes follow, to a greater or smaller extent, the example of the Hohenzollerns. This does not at all mean that he is to be a soldier only. But a monarch like Louis XVI, who never wore a soldier's coat, would have been a lost man in the present time.

The question has again been raised whether the "drill" could be relaxed somewhat in favor of the training for fighting in extended order. In this question the greatest circumspection must be used, because the habit of strict drill of the individual and the rigid exercising of troops, is to us a guaranty for keeping together the units in close order in action. According to my opinion, we can not, for instance, give up marching in strict cadence in small and large bodies, although it may not often be possible to use it in the field. It is a means of discipline, and in this case the inner and outer motives coincide. The proscription of all undue stress laid on drill must, on the other hand, be strictly carried out. To attain good results in parades should never be the only thing aimed at.

The German soldier does not give much for long speeches and harangues. A few vigorous words suffice before the battle. We should also, in time of peace, limit ourselves to a certain brevity during instruction in fighting. Some principles will be given which will make clear to the man the situation in which he may happen. Thus, for instance, that *he will be a dead man if he turns tail during the charge*. "To

retreat under the fire of the breechloader means to die," I wrote in 1869, and although everybody does not really die in this case, yet the idea must be impressed on the soldier. This has more effect than the finest speeches about sense of honor and duty, if suitable words are not, on the whole, spurned in this case. But everybody has not the faculty to express himself impressively and briefly.

As regards the fighting discipline, fire discipline is an important part thereof. This is closely connected with the use of fire. If the principles are incorrect here, the maintenance thereof will be very difficult.

It was a wrong procedure when it was formerly desired to control fire by designating a number of cartridges. It was the same with the extensive use of swarm volleys.

But in this matter the Boer war gives us a lesson, or rather, it confirms old lessons. We have always maintained the principle—the use of fire at the shortest possible distance—and even advocated for this purpose to go to a certain extreme in this matter in the instruction of the soldier in order to attain the greatest possible result. It is now evident that the ranges must be extended on account of the introduction of improved weapons with their long ranges and other advantages, but they can be increased only so far as the human vision reaches. If the officer can work with a field glass, every soldier can certainly not be given one. The proposition to give one to each noncommissioned officer goes also certainly too far, because his task is principally to keep his group in order. The oldest noncommissioned officer in the platoon might at any rate be provided therewith, in order to take the place of the officer should the case occur.

Now, first as to the attack. The officer can merely designate the object, in the case of a lying-down enemy at distances over 700 meters, at which the fire is to be directed, and whoever has had war experience will know that even this fire will, in fact, be mostly a shooting into the air. We will not dispute the fact that the ground is made insecure thereby, but can this compensate for the other great disadvantages of long ranges? We have pointed this out so often in other works that we can be brief here.

In the first instance, therefore: waste of ammunition at long ranges—lack of cartridges at the really effective range. This

danger was already present with the single loader. It will, however, be counteracted by the principle, "Shoot close." That is a principle which is very comprehensive to the private soldier, the usefulness of which for the fight he understands.

The advocates of long-range fire now assume, on account of target-range results, a superior air, and refer to the advocates of short-range fire as unprogressive, because, they say, the fire of the defender will make itself felt already at long ranges to such an extent that it must be answered. But it is just here that the soldier's training must begin as soon as possible by inculcating the short principle: Advance as close as possible, otherwise you will not hit. The troops must be able to hold out and advance without firing. This is also expressly emphasized in our regulations and is advanced as a principle. Now, at what distance it seems proper to the leader to open fire, whether it be because the enemy presents greater targets or whether he, in concrete cases, considers replying necessary, must be left to him, but the principle must be before him and he must take it into account as much as possible.

The newest tendency is directed toward affording the initiative of the individual soldier a still greater latitude. It is not only to be left to him whether and when he wants to fire, but he is also to take his elevation and holding point at pleasure. We have opposed strenuously in our time the exaggerations in the conduct of fire, which aims to make a skirmisher of the man in ranks, and we have often practiced uncontrolled fire on the target range. But when this is considered most effective, I believe that it is too far on the other side. Ideal shots would be needed if this were correct, and these we have not now and will never have. And I believe for this reason that there can be, for lying-down and kneeling targets, only one holding point in war, and that is: Constantly at the bottom of the object. However much firing results obtained in time of peace may be quoted against it, this holding point is the proper one in war.

The use of fire is naturally different in the prepared defense. In this the distances are marked, and longer ranges are permitted for this reason. The ammunition carts will already have emptied their contents in the rifle pits, and the ammunition columns will be brought forward. But here also it will mean that we must remain conscious of the fact that

there is a requirement of obtaining an annihilating effect, and this can be obtained only at the middle and short ranges.

The question may very well be agitated whether the shooting ability of our infantry can be increased. I do not believe that a still greater increase of the target practice exercises is possible without hurting other service matters. Accustoming the eye to detect small objects and an early beginning of firing on warlike objects can alone have any influence in this matter. Although the shooting ability of the Boers may have been greater than that of our infantry—many even dispute it—it certainly seems to me that one of the greatest merits of their successes, as far as they are on the whole attributable to fire, lies in appreciating the practical rules which they had learned in hunting and fighting with savage peoples, and these are: No waste of ammunition, fire at short distances.

The deployment of the Boers for action, very often in one single long line, as, for instance, at Modder River, is worthy of our imitation in exceptional cases only. It may happen that everything will be deployed in order to hold this or that point against superior numbers. We have already shown in our consideration of Modder River what disadvantages this may have. On the other hand the construction of the shelter trenches, and the disguising thereof, as also the throwing up of such trenches at nondefended points, are worthy of study.

With the exception of quite isolated cases (especially at Spion Kop, January 24, 1900), the Boers were, as we have shown, in the first two periods of the war, purely on the defensive, from which a tactical result can certainly be gained, but never a defeat of the attacker.

The Boers showed a real attacking spirit only in minor operations, and fine deeds are to be recorded here, just as at Majuba Hill in 1881. This climbing of steep slopes covered with boulders and sudden attack on the surprised English, as at Tweefontein—*that* is the real Boer attack. In modern times the smaller operations of war have been more practiced, and that is right, because the weakness of our communications will assign an important rôle to them. Mounted infantry or cavalry with machine-gun detachments and good firearms seem the most appropriate arms for them.

IX. SOMETHING CONCERNING THE OTHER ARMS.

ARTILLERY.

Although this work has taken for its object the elucidation of the group attack, it is, however, not amiss to say a word concerning the manner in which the other arms have shown up in the Boer war.

For the last 10 years there has been a more and more decided manner in speaking of the increased effect of the artillery, which has, indeed, nearly kept pace with the rifle in technical improvements. Many went so far as to see in it the principal arm of the future. It is not necessary to show that this is an exaggerated illusion. It is a glaring contradiction of the reality of war. It may be the principal weapon in certain instances in battle, but not as a rule. But the very great increase of the artillery in all states, and especially in Germany, demonstrates the value put upon the arm.

The general failure of the English artillery, notwithstanding its mass fire, is certainly calculated to put a damper on extravagant expectations as regards its effect against well-posted infantry in a fortified position. Consider that artillery, far superior in numbers, obtained—often without having a single gun reply to it—virtually no effect with its mass fire, and that notwithstanding a fire lasting several hours.

But we have already pointed out that the nature of the country was largely responsible for the failure. Many actions took place in the often-described mountainous tracts, which offered most excellent cover, made aiming difficult, and consequently greatly decreased the effect. The Boers had, conformably to their method of fighting, behind their thin line no massed reserves against which the curved fire of the English might have been effective. Thus the losses of the Boers were diminished.

But, on the whole, the small results of the English artillery point to the customary use of curved fire, which admirers of the uniform caliber and the “alone saving” shrapnel have not so long ago discarded entirely for the field artillery.

The cultivated regions and central mountains of Europe present cover for masses of troops that can be swept with curved fire only. It should not be overlooked that the English artillery did obtain great effect everywhere with concen-

trated fire in the nonmountainous regions, as in the action at Riet River against the right flank of the Boers.

The isolated artillery positions of the Boers suited their general tactics. They would, notwithstanding their better material, soon have been worsted in the artillery duel, if they had wanted to employ a kind of mass tactics. They appeared here and there in the terrain with two to six guns and were called upon to fire in certain instances only. It was a kind of artillery skirmish tactics.

It is more than 12 years ago that our artillery adopted the fighting method of taking the greatest possible advantage of the ground. The muzzle is to be seen only just above the crest. Much has been written concerning this. Who would say anything against this if positions suitable thereto are at hand and the absolutely necessary mass effect of our artillery is not interfered with? Long, continuous lines are not always necessary to obtain this mass effect, but the effect may be obtained with groups from different positions. Nobody disputes this, but the principle that the cover should interfere neither with the effect nor with the rapid opening of the fire has nowhere a greater importance than in the case of this arm. If such cover is not found, the unlimbering must be done as formerly, and "the shells must be the best cover," as General von der Planitz is alleged to have said.

Consequently we learn from the Boer war, as regards artillery, that we must guard against overestimating our firing results in time of peace.

Still a word concerning armored field artillery.

We have recently heard the decided opinion expressed by a competent authority that armored field artillery, like that which the French now possess, will be decidedly superior to the unarmored. The shields will also afford such a cover against infantry fire that the artillery can advance unhesitatingly nearer to the infantry than heretofore.

This might be concurred in, but experiments are already under way to invent a shell which will penetrate the shields. This is said to be the case with steel shrapnel bullets. We would thereby enter into the same stage of the struggle between armor and gun as in the navy. But since in the field artillery the armor could certainly not be strengthened to the same extent as in the navy, because the guns would otherwise

be too heavy and too little mobile, the victory of the gun seems undoubted in the end. On account of the penetration, the position of the caissons beside the guns, also adopted by the French, would be quite a dangerous arrangement.

Therefore, the lessons applicable to our conditions that we can still learn from the Boer war is the experience that the armored part of the Boer artillery had the advantage of an unarmored artillery inferior in effect; further, that the defender in a strongly fortified position may do well under certain circumstances to avoid the artillery duel altogether, and first put his artillery into action to repulse the enemy's infantry attack; but above all, that the piecemeal coming into action of the artillery, as that of the English at Colenso and Magersfontein, without previous reconnaissance of the enemy's position, is altogether faulty. The union of the arms must be maintained and the infantry must, in case it is necessary, engage to such an extent that the occupation of the position becomes evident.

We find no place in this work for other questions of the organization and tactics of the artillery.

CAVALRY.

The English in the Boer war, and we also in China, have many times formed and employed mounted infantry. Thus the dragoons in the old sense of the word seem to have again come forth. But they were not quite the same as the present mounted infantry, because they were also able to attack on horseback, but the mounted infantry uses the horse as a means of transportation only, in order to reach quickly the place where it is to act dismounted with its fire. We contend that we do not need it in Europe, since our cavalry with its excellent carbine is able to produce the same effect.

It is indeed asserted that the English cavalry made only one attack, that at Elandslaagte; that it performed the reconnoitering with incredible carelessness, but that it did, on the other hand, take an effective part several times during the advance of Lord Roberts on Bloemfontein and Pretoria, by means of turning movements and threatening the enemy's flank. Nothing is heard of a lasting pursuit, which was possible, for instance, at Modder River, but, on the other hand, the rapid dash of General French—a general who did, on the

whole, perform conspicuous service—for the relief of Kimberley is worthy of mention. How important is good training of men and horses was shown in the action at Tweebosch, where Methuen was wounded and captured; the badly trained new English cavalry scarcely reconnoitered to a distance of a few hundred paces.

In this action the galloping up of the Boers to within a few hundred meters of the English infantry escorting the train, in open order to fire, is of interest, because it was thus demonstrated that cavalry is still able to advance to such distances, but in this case it must certainly be taken into account that the line of infantry escorting the train was very thin.

Now, as the new fighting regulations for the combined arms show, the English have drawn this conclusion from the war,—that the rôle of cavalry in the action itself extends principally only to threatening the enemy's flanks with dismounted men. There is, therefore, no question of an attack, but simply of taking the fullest advantage of the enemy's mistakes. The rôle of the cavalry in the pursuit is similarly emphasized as it is everywhere.

Although it must be recognized absolutely that the action of cavalry against infantry is limited on account of the continued improvements in firearms, the varying skirmish fight will, however, present instances which it seems very possible to utilize for an energetic stroke. In the pitched battle, according to my opinion, it will be practicable only with smaller masses; in the pursuit and in the actions of cavalry against cavalry, which take place before the front, with larger masses also. The English fighting regulations, therefore, seem to carry the depreciation of the cavalry attack very far.

The cavalry is the arm for reconnoitering. But although it may have driven the enemy's advanced cavalry divisions from the field and then receives fire, it is, however, in covered and mountainous stretches of ground unable to discover what it has in its front, whether dismounted cavalry or infantry. Reconnoitering has become still more difficult since the adoption of smokeless powder. Reconnoitering forces must therefore frequently resort to fighting on foot in order to obtain passable results. This is one of the most obvious deductions of the Boer war, in which the English cavalry was of so little use in reconnoitering.

That the Boers often neglected the mounted reconnoitering service, and avoided reconnoitering to long distances, is attributable to the lack of discipline which manifested itself so frequently.

PIONEERS.

At the present time the infantry everywhere is capable of constructing the necessary field fortifications. The Boers have again shown that pioneers are not necessary for this. On the other hand, pioneers must remain the teachers of the infantry, and must therefore exert themselves continually to perfect the practical instructions for the construction of field fortifications. For this are necessary a complete tactical understanding and knowledge of the science of firing. The concealment of the rifle pits is especially to be considered. Practical experiments as to how far the construction of tiers can be carried, are very much to be recommended.^a

The sieges of Kimberley, Mafeking, and Ladysmith consisted only of surrounding, together with bombardment; there was never a question of a real attack. The Boers lacked pioneers and engineer officers. The evacuation of Pretoria, which city was intrenched by means of forts, was correct. If the Boers should have defended it, they would have been compelled to throw in there their whole still disposable fighting force. The English would have besieged it in the proper manner, and resistance would have ceased with the fall of Pretoria.

THE TRAIN.

The train, and with it the English intendance, accomplished great things, especially in the second part of the war, considering the extent of the theater of operations, the limited resources of the country, and the threatening of the communications. It is worthy of a closer study.

^a We conceive the experiments thus, that two shelter trenches be thrown up on a slope, one behind the other, a line of lying down skirmish targets be placed in the lower, the enemy at 600 to 700 meters being represented by targets, and fire be opened from the upper, occupied shelter trench. It could then be verified whether the lying down targets in the lower trench have received any shots, and an approximate basis would be had as to whether such a procedure would be possible in the field and at what distance apart both shelter trenches would have to be on a steep slope. We consider it as altogether excluded in the case of a gentle slope.

RÉSUMÉ AND CONCLUSION.

1. A frontal attack over open ground is difficult and should, for that reason, be avoided as much as possible, but is, with a proper use of the troops, and due preparation, never to be regarded as impracticable.

2. The phrase, that open, level places can not be entered under hostile fire, is pernicious, because it tends to weaken the spirit of the initiative.

3. An advance by groups may be used in case of special forms of ground, and principally in small actions or in the partial actions of a battle. But this is something different from the group attack now proposed. This will, as a rule, lead to a too great extension, a weakening of the influence of the leader, and an early mixing up of the units in large battles.

4. The initial fire effect is too small. The drop-like pushing in of reinforcements (filling up) can not remedy it.

5. Therefore the deployment from the beginning, on any kind of ground, of strong skirmish lines is necessary.

6. They are to advance on open ground by platoon rushes, which are to be carefully practiced.

7. The length of the rushes on open ground to be not less 50 to 60 meters; on intersected and hilly ground according to the localities.

8. The units, pushing in, act, according to circumstances, either with fire or carry the skirmish lines with them to a renewed advance.

9. On open ground the charge (assault) takes place at charging gait with rapid fire while in motion. The bayonet will be fixed at 500 to 600 meters from the enemy. The last 30 to 40 meters will be covered at a run without firing.

10. The organizations of the second and third lines follow, either in groups, in deployed lines, in ranks or sections (it may be that an obstacle compels such a formation), or in company columns or in line. In this case a line, shortened by one-half, may be formed by placing the second half platoon in rear of the first.

11. The organizations in close order, belonging to the first line, keep on open ground a distance of about 200 meters from the skirmish line.

12. But the organizations intended for the assault must be brought up in front of them close to the skirmishers, in case the skirmish line does not by its own initiative take advantage of a favorable moment for the assault.

13. It is permissible to extend the deployment of a company from 100 to 150 meters and that of the battalion to 450 meters. If the conditions require the development of the whole fire power at once, the battalion may be deployed to the last man.

14. The use of fire at the shortest possible distance is to be impressed on the leaders and troops again and again. Exact distances can not be laid down therefor.

15. In the case of the higher leaders the principle "strong reserves" is continually to be taken into account. The skill of Napoleon the First to wait with the distribution until a crisis becomes clearly perceptible, must be revived.

Looking back on a time which has seen such radical tactical and technical changes—it is only necessary to say the words "smoothbore musket and magazine rifle"—including at the same time the great war events of 1854, 1855, 1859, 1864, 1866, 1870–71, and 1877–78, I have since 1868 taken part in representing and considering the events, and have on that account received much recognition, but have also been much contradicted, as is certain to occur with everybody who appears in public.

The never-waning interest of the old soldier for his profession, has prevailed upon me to utter freely my opinion in regard to the last war experiences and their utilization.

BIBLIOGRAPHY.

LIST OF WORKS IN THE LIBRARY OF CONGRESS ON THE BOER WAR.

Compiled for the
SECOND DIVISION, GENERAL STAFF, U. S. ARMY,

Under the direction of
A. P. C. GRIFFIN,
Chief Bibliographer, Library of Congress.



BIBLIOGRAPHY.

LIST OF WORKS IN THE LIBRARY OF CONGRESS ON THE BOER WAR.

- ABBOTT, J. H. M. *Tommy Cornstalk; being some account of the less notable features of the South African war from the point of view of the Australian ranks.* New impression. London, New York, and Bombay: Longmans, Green, and co., 1902. x, (2), 264 pp. 12°.
- ADAMS, BROOKS. *America's economic supremacy.* New York and London: The Macmillan co., 1900. ix, 222 pp. Map. 12°.
- ADAMS, CHARLES FRANCIS. *The confederacy and the Transvaal . . . a paper read before the American antiquarian society, October 30, 1901.* Boston: Houghton, Mifflin & Co., 1901. 25 (1) pp. 8°.
- AMERY, LEOPOLD S. *ed.* *The Times history of the war in South Africa, 1899-1900.* 2d ed. Vols. 1-2. London: Sampson Low, Marston and company, 1900-1902. 2 vols. Plates. Portraits. Maps. Plans. 8°.
- ARCHIBALD, JAMES FRANCIS JEWELL. *Blue shirt and khaki; a comparison . . . with illustrations from photographs taken by the author.* New York, Boston, etc.: Silver, Burdett and co., 1901. 269 pp. Illustrations. Frontispiece. 12°.
- ASHE, EVELYN OLIVER. *Besieged by the Boers; a dairy of life and events in Kimberley during the siege . . .* New York: Doubleday, Page & co., 1900. (16), 175 pp. Plates. Portraits. 12°.
- BACON, AUGUSTUS OCTAVIUS. *Resolution of sympathy for the South African republics. Remarks of Hon. A. O. Bacon, of Georgia, citing speeches of eminent statesmen in the Senate . . . May 29, 1900.* Washington: [Government printing office], 1900. 16 pp. 8°.
- BAR, KARL LUDWIG VON. *Der Burenkrieg, die Russificirung Finnlands, die Haager Friedensconferenz und die Errichtung einer internationalen Academie zur Ausgleichung von Streitigkeiten der Staaten.* Hannover: Helwingsche Verlagsbuchhandlung, 1900. vii, 61 pp. 8°.
- BARNES, JAMES. *The great war trek with the British army on the veldt.* New York: D. Appleton and co., 1901. xii, 372 pp. 12°.
- BATTERSBY, HARRY FRANCIS PREVOST. *In the web of a war.* London: Methuen & co., 1900. xii, 297, (1) pp. Frontispiece (portrait). 3 maps. 12°.
- BECK, HENRY HOUGHTON. *History of South Africa and the Boer-British war. Blood and gold in Africa.* Philadelphia: Globe Bible pub. co., [1900]. 493 pp. Illustrations. Plates. Portraits. Map. 8°.

- BIGELOW, POULTNEY. *White man's Africa*. Illustrated by R. Caton Woodville and from photographs. New York and London: Harper & brothers, 1898. xvi, (2), 271 pp. Plates. Portraits. 8°.
- BIRCH, JAMES H., *jr.*, and HENRY DAVENPORT NORTHROP. *British and Boers in South Africa*; containing a thrilling account of the great struggle between the British and the Boers . . . together with the wonderful story of the Transvaal . . . Philadelphia: National pub. co., [1900]. 488 pp. Illustrations. Plates. Portraits. 8°.
 Pages 1-434 pub. also under title "History of the war in South Africa."
- *History of the war in South Africa*; containing a thrilling account of the great struggle between the British and the Boers . . . together with the wonderful story of the Transvaal . . . Philadelphia: National pub. co., [1899]. vii, 17-434 pp. Illustrations. Plates. Portraits. 8°.
- BLAKE, JOHN Y. FILLMORE. *A West Pointer with the Boers*; personal narrative of Colonel J. Y. F. Blake, commander of the Irish brigade. Boston: Angel Guardian press, 1903. (2), 411 pp. Plates. Portraits. 8°.
- [BOISSEVAIN, CHARLES.] *The law of nations and the law of humanity*. An open letter to President Roosevelt of the United States. [Amsterdam: Handelsblad office, 1901.] 9-12 pp. F°. (Algemeen handelsblad van woensdag 9 oktober 1901—Avondblad—Derde blad.) Dated "Amsterdam, 25 September, 1901."
- *Open letter to the Duke of Devonshire*. Amsterdam: "[Algemeen] handelsblad" office, [1899]. 16 pp. 4°.
- *The struggle of the Dutch republics*. A great crime. (An appeal to the conscience of the British nation.) Amsterdam: "Handelsblad" office, [1900]. 49 pp. 8°. Cover-title.
- *The struggle of the Dutch republics*. (Two open letters.) Amsterdam: "Handelsblad" office, [1900]. 56, 93, (1) pp. 12°. Each letter has separate title-page and pagination.
Contents: — pt. 1. Open letter to the Duke of Devonshire.— pt. 2. Open letter to an American lady.
- BOVILL, JOHN HENRY. *Natives under the Transvaal flag*. London: Simpkin, Marshall, Hamilton, Kent and co., 1900. (12), 82 pp. Plates. Frontispiece. 12°.
- BRITAIN AND THE BOERS. Both sides of the South African question. New York: The North American review pub. co., [1899]. (45) pp. Map. 8°. "Reprinted from the North American review."
Contents: England and the Transvaal, by Sydney Brooks.—A vindication of the Boers, by a diplomat.—A Transvaal view of the South African question, by Dr. F. V. Engelenburg.
- BRITAIN AND THE BOERS. Both sides of the South African question . . . no. 2. New York: The North American review pub. co., [1899-1900]. (64) pp. Map. 8°. "Republished from the North American review."
Contents: Bryce, J., Historical causes of the war.—Carnegie, A., South African question.—Grey, A. H. G. G. *earl*, England and the Transvaal.—White, M., Blunders of the British.
- BRITON AND BOER; both sides of the South African question, by Right Hon. James Bryce, Sydney Brooks [and others]. New and enl. ed.

New York and London: Harper & brothers, 1900. xi, (3), 309, (1) pp. Plates. Portraits. Folded map. 12°. "Reprinted from the North American review."

L. C. also has first edition.

BRYCE, JAMES. Impressions of South Africa. 3d ed., with a new prefatory chapter, and with the Transvaal conventions of 1881 and 1884. New York: The Century co., 1900. lx, (2), 517 pp. Folded maps. 8°.

[BUNCE, CHARLES T.] *comp.* The real Kruger and the Transvaal; the Britons' side, the Boers' side, the historical facts. Compiled from various sources. New York: Street & Smith, [1900]. (2), vi, 11-218 pp. Illustrations. Plates. Portraits. 12°. (Historical series, no. 12.)

CHURCHILL, WINSTON [LEONARD] SPENCER. Ian Hamilton's march . . . , together with extracts from the diary of Lieutenant H. Frankland, a prisoner of war at Pretoria. New York, London, etc.: Longmans, Green, & co., 1900. xii, (2), 409 pp. Maps. Plans. Frontispiece (portrait). 12°.

— London to Ladysmith via Pretoria. New York, London, etc.: Longmans, Green, & co., 1900. xi, (2), 496 pp. Illustrations. Maps. 12°.

CLOUD, WILLIAM F. Webster Davis on toast. Facts, not fiction, sense, not sobs, about the Boer-British war, with strictures on the flop. Kansas City, Mo., 1900. (2), 26 pp. Portraits. 12°.

THE COLUMBIAN CORRESPONDENCE COLLEGE. Washington, D. C. The Columbian atlas of two wars; containing large scale maps of the Philippine islands and South Africa. Washington, D. C.: The Columbian correspondence college, 1900. (2), 16, (1) pp. Illustrations. F°.

COMBES, PAUL. Cent ans de lutte. Les héros Boers. Prétorius, Kruger, Steijn, Joubert, Cronjé, Botha, Ollivier, Dewet, Villebois-Mareuil, etc. Première guerre du Transvaal (1881); Le raid de Jameson (1895); La guerre anglo-boer de 1899-1900. Paris: Montgredien et cie., [1901.] ix, 322 pp. Illustrations. Plates. Portraits. Maps. 4°.

COOK, EDWARD TYAS. Rights and wrongs of the Transvaal war. New and rev. ed. London: E. Arnold, 1902. xi, 393 pp. 12°. "Blue-books referred to," pp. 390-391. "Chronological list of the more important despatches referred to," pp. 392-393.

CRESWICKE, LOUIS. South Africa and the Transvaal war. With numerous illustrations and maps. Edinburgh: T. C. & E. C. Jack; New York: G. P. Putnam's sons, 1900-01. 6 vols. Illustrations. Plates (partly colored). Portraits (partly colored). Colored frontispiece. Maps. 4°.

CROWE, GEORGE. The commission of H. M. S. "Terrible," 1898-1902. London: G. Newnes, 1903. xvi, (2), 370 pp. Plates. Portraits. Map. Plan. Diagrams. 8°.

CUNLIFFE, FOSTER HUGH EGERTON. The history of the Boer war. London: Methuen and co., 1901-1904. 2 vol. Illustrations. Maps. Plans. 4°.

DAVIN, NICHOLAS FLOOD. South African war, the Canadian contingents. A speech . . . delivered in House of Commons February 16, 1900. [Ottawa? 1900.] 10 pp. 8°.

- DAVIS, RICHARD HARDING. With both armies in South Africa. New York: C. Scribner's sons, 1900. xi, 237 pp. Plates. Portraits. 12°.
- DAVIS, WEBSTER. John Bull's crime; or, Assaults on republics. New York, London, etc.: The Abbey press, [1901]. (18), 225 pp. Illustrations. Plates. Portraits. 8°.
- DAVITT, MICHAEL. The Boer fight for freedom. New York and London: Funk & Wagnalls company, 1902. xii, 603 pp. Illustrations. Maps. Folded map. Frontispiece. 8°.
- DEMOLINS, EDMOND. Boers et Anglais, où est le droit? 2. mille. Paris: Firmin-Didot et cie., [1900]. 24 pp. 8°. Extrait de "La Science sociale."
- DESJARDINS, ACHILLE ARTHUR. Le Transvaal et le droit des gens. Paris: De Soye et fils, 1896. 35 pp. 8°. Extrait du Correspondant.
- DESPAGNET, FRANTZ CLÉMENT RENÉ. La guerre sud-africaine au point de vue du droit international. Paris: A. Pedone, 1902. (4), 402 pp. 8°.
- DE WET, CHRISTIAAN RUDOLF. Three years' war; frontispiece by John S. Sargent. Four plans and a map. New York: C. Scribner's sons, 1902. x, 448 pp. Plans. Portrait. Folded map. 8°. "The original . . . [was] written . . . in Dutch."
- Dix mois de campagne chez les Boërs par un ancien lieutenant du colonel de Villebois-Mareuil. Paris: C. Lévy, [1901]. (6), 267 pp. Plates. Portrait. Folded map. 12°.
- [DOUGLAS, MARY.] The Cape and its story; or, The struggle for South Africa, by the author of "Breaking the record," "In lionland," "Across Greenland's ice-fields," etc., etc. London, Edinburgh, and New York: T. Nelson and sons, 1903. viii, 314 pp. Frontispiece. Colored plate. 12°. Added title-page with portrait in colors.
- DOYLE, *Sir* ARTHUR CONAN. The great Boer war. Rev. and enlarged ed. New York: McClure, Phillips & co., 1902. x, (4), 446 pp. Maps in pocket. 8°.
- The war in South Africa, its cause & conduct. New York: McClure, Phillips & co., 1902. (4), 140 pp. 8°.
- DULLES, ALLEN WELSH. The Boer war; a history. (3d ed.) Washington, D. C., 1902. 31 pp. 24°. "The author of this history is eight years old."—Preface.
- DU PLESSIS, C. N. J. The Transvaal Boer, speaking for himself. Some passages from "Uit de geschiedenis van de Zuid-Afrikaansche Republiek en van de Afrikaanders." Selected and tr. by R. Acton. 3d ed. London: Jarrold & sons, [1899]. 120 pp. 12°.
- EDWARDS, NEVILLE. The Transvaal in war and peace. London: H. Virtue and company, 1900. iv, 384 pp. Illustrations. Portraits. 4°.
- EVANS, W. SANFORD. The Canadian contingents and Canadian imperialism. A story and a study. London: T. F. Unwin, 1901. xii, 352 pp. Illustrations. Plates. Portraits. Maps. 8°.
- FARRELLY, M. J. The settlement after the war in South Africa. New York & London: The Macmillan co., 1900. xv, 323 pp. 8°.
- FISHER, SYDNEY GEORGE. The American revolution and the Boer war; an open letter to Mr. Charles Francis Adams on his pamphlet "The con-

- federacy and the Transvaal." [Philadelphia: G. H. Buchanan and company], 1902. 33 pp. 8°. "Reprinted from the Philadelphia Sunday Times of January 19, 1902."
- FISHER, W. E. GARRETT. *The Transvaal and the Boers; a short-history of the South African Republic, with a chapter on the Orange Free State.* London: Chapman & Hall, 1900. ix, (2), 394 pp. Map. 8°.
- FROCARD, [PAUL MARIE], and [Achille Paul Arsène] Painvin. *La guerre au Transvaal.* Paris: Cerf, 1900-1901. 2 vols. Illustrations. 12°.
- GRAYDON, WILLIAM MURRAY. *With Boer and Britisher in the Transvaal.* New York: Street & Smith, [1900]. 203 pp. 12°. (Medal library, no. 39.)
- GREEN, JAMES. *Causes of the war in South Africa.* Worcester, Mass., 1900. 26 pp. 8°. A paper read before the Worcester society of antiquity.
- GROUT, LEWIS. *The Boer and the Briton in South Africa; or, The present war in its historical and moral bearings; a paper read at a meeting of the Brattleboro professional club, November 14, 1899.* 3d ed. Brattleboro, Vt.: The Phoenix job printing office, 1900. 24 pp. Portrait. 8°.
- . A critique on "Bishop Hartzell's great lecture" in Chicago, May 2, 1900, on "The Briton and the Boer." Brattleboro, Vt.: The Phoenix job printing office, 1900. 16 pp. Portrait. 8°.
- GUYOT, YVES. *Boer politics.* Translated from the French. London: J. Murray, 1900. xviii, 155 pp. 12°. Appeared originally in *Le Siècle*.
- . *Inglesi e Boeri. Estratto dal Siècle, 3 febbraio, 1900.* [London: Women's printing society, 1900.] 7 pp. 8°. Caption title.
- HALSTED, MURAT. *Briton and Boer in South Africa.* [Philadelphia? 1900.] 542 pp. Plates. Portraits. Map. 8°.
- HAMMOND, JOHN HAYS. *The Transvaal trouble; an address.* New York: The Abbey press, [1900]. 37 pp. 12°.
- HAMMOND, NATALIE (HARRIS). "Mrs. John Hays Hammond." A woman's part in a revolution. New York, London, etc.: Longmans, Green, and co., 1897. (6), 144 pp. 16°. Extracts from a diary (Dec. 30, 1895-June 12, 1896) dealing chiefly with the Jameson raid.
- HASSELL, JOHN ARTHUR. *The Boer concentration camps of Bermuda.* New York: J. A. Hassell, [1902.] 16 pp. Plates. 8°.
- HILEY, ALAN R. I., and JOHN A. HASSELL. *The mobile Boer; being the record of the observations of two burgher officers.* New York: The Grafton press, [1902]. xvii, 277 pp. Plates. Portraits. Maps. Plans. 12°.
- HILLEGAS, HOWARD C. *The Boers in war; the story of the British-Boer war of 1899-1900, as seen from the Boer side, with a description of the men and methods of the republican armies.* New York: D. Appleton & co., 1900. xii, 300 pp. Illustrations. Map. Frontispiece. 12°.
- . *Oom Paul's people; a narrative of the British-Boer troubles in South Africa, with a history of the Boers, the country, and its institutions.* New York: D. Appleton & co., 1899. xi, 308 pp. Plates. Map. 12°.

- HOBSON, JOHN A. The war in South Africa; its causes and effects. New York: The Macmillan company, 1900. viii, 324 pp. 8°.
- HOFMEYR, ADRIAN. The story of my captivity during the Transvaal war, 1899-1900. London: E. Arnold, 1900. xii, 302 pp. Frontispiece (portrait). Plate. 12°.
- HOLMES, PRESCOTT. Paul Kruger; the life story of the president of the Transvaal. With thirty-two engravings. Philadelphia: H. Altemus [1900]. 154 pp. Plates. Portraits. Map. 12°.
- HOOKE, LE ROY. The Afrianders; a century of Dutch-English feud in South Africa. Chicago & New York: Rand, McNally & co., 1900. 279 pp. Plates. Portraits. Map. 12°.
- HOWLAND, FREDERICK HOPPIN. The chase of De Wet and other later phases of the Boer war as seen by an American correspondent. Providence: Preston and Rounds co., 1901. (8), 203 pp. Portrait. Map. 8°.
- HUTCHESON, ROBERT. The truth about the South African question. Washington, D. C., 1900. 31 pp. 16°. (British-American association, Columbus, O. Tract no. 1.)
- IRELAND, ALLEYNE. The Anglo-Boer conflict; its history and causes. Boston: Small, Maynard & co., 1900. ix, 141 pp. 16°.
- Bibliography, pp. 137-141.
- JOUBERT, P. J. Een ernstige representatie en historische herinnering aan hare majesteit koningin Victoria. Pretoria: "Land en volk" drukkerij, [1899]. 19 pp. 12°. Cover-title.
- An earnest representation and historical reminder to Her Majesty Queen Victoria. Pretoria: "Land en volk" office, 1899. 18 pp. 12°. Cover-title.
- [KALER], JAMES OTIS. Fighting for the empire; the story of the war in South Africa. By James Otis, [*pseud.*] Boston: D. Estes & company, [1900]. xxi, 11-466 pp. Plates. Portraits. Double map. 8°.
- KEARSEY, ALEXANDER HORACE CYRIL. War record of the York & Lancaster regiment, 1900-1902, from regimental and private sources. With a preface by Colonel Kirkpatrick . . . illustrated with photographs and sketches by H. R. Headlam and E. Cooke. London: G. Bell and sons, 1903. x, 277 pp. Illustrations. Plates. Portraits. Map. 8°.
- KNOX, ERNEST BLAKE. Buller's campaign with the Natal field force of 1900. London: R. B. Johnson, 1902. xx, 336 pp. Plates. Maps (partly folded). 8°.
- KRUGER, PAUL. The memoirs of Paul Kruger, four times president of the South African Republic, told by himself. London: T. F. Unwin, 1902. 2 vols. Frontispieces (portraits). 8°.
- KUNOWSKI, ERNST VON, and FRETZDORFF. Der Krieg in Südafrika. Nach den besten vorhandenen Quellen . . . 3. Aufl. Leipzig: Zuckschwerdt & co., 1900-1901. 3 pts in 1 vol. Maps. Plans. 8°.
- Paged continuously.
- LETTERS FROM AN UITLANDER, 1899-1902, with introduction by Major Sir Bartle Frere. London: J. Murray, 1903. (6), 167, (1) pp. 8°.

- LOWRY, EDWARD P. With the Guards' brigade from Bloemfontein to Koomati Poort and back. London: H. Marshall & son, 1902. xii, 277, (1) pp. Plates. Portraits. 8°.
- MACKENZIE, WILLIAM DOUGLAS, and ALFRED STEAD. South Africa; its history, heroes, and wars . . . illustrated . . . under direction of G. Spiel. Chicago & Philadelphia: Monarch book co., [1899]. 663 pp. Illustrations. Plates. 8°.
- MACKERN, HENRY F. Side-lights on the march; the experiences of an American journalist in South Africa. London: J. Murray, 1901. xv, 256 pp. Frontispiece. Plates. 8°.
- MAHAN, ALFRED THAYER. The war in South Africa; a narrative of the Anglo-Boer war from the beginning of hostilities to the fall of Pretoria . . . with an introduction by Sir J. G. Bourinot. New York: P. F. Collier & son, 1900. xviii, 11-208 pp. Illustrations. Plates (partly colored). Portraits. Map. Obl. 4°.
- MASON, WILLIAM ERNEST. The war in South African republics . . . Speech of Hon. Wm. E. Mason, of Illinois, in the Senate . . . December 11, 1899. Washington: [Government printing office], 1899. 31 pp. 8°.
- MAYDON, JOHN G. French's cavalry campaign. 2d ed. London: C. A. Pearson, 1902. xxix, 31-197, (1) pp. Portrait. Plates. 12°.
- MEAD, EDWIN DOAK. Old and new books on South Africa. [Boston? 1900.] 12 pp. 8°. "Reprinted from the New England magazine, May, 1900."
- The two Englands and their lessons for America. Boston, 1900. 24 pp. 8°.
- METHUEN, ALGERNON MARSHALL STEDMAN. Peace or war in South Africa. American ed. (Reprint) by Charles D. Pierce. New York, [1901.] iv, (2), 91, (2) pp. Maps. 8°.
- MEYERS, ROBERT C. V. The story of South Africa written especially for young people. [Philadelphia: P. W. Ziegler & co., 1900.] 380 pp. Frontispiece. Plates. 8°.
- MILLER, JAMES MARTIN. South Africa; scenes from the "Dark continent" and the British-Boer war. Chicago: Stereopticon & film exchange, 1900. 16 pp. 8°.
- MILNE, JAMES. The epistles of Atkins. Being some of the lights, on human nature in the ordeal of war, which illumine the letters of the common soldier, written from South Africa to his people at home; and so an answer to the question, "How does it feel to be in battle?" [2d impression.] London: T. F. Unwin, 1902. vii, 226, (2) pp. Plates. 12°.
- MUSGRAVE, GEORGE CLARKE. In South Africa with Buller; illustrated from sketches by R. Bull, Maud, R. C. Woodville, and other war artists. Boston: Little, Brown, & co., 1900. xviii, 364 pp. Frontispiece. Plates. Map. 8°.
- NAVILLE, ÉDOUARD [HENRI]. The Transvaal question from a foreign point of view; tr. from the French [by M. Vetch]. Edinburgh and London: W. Blackwood & sons, 1900. 64 pp. 12°.
- NEIL, C. LANG, *ed.* South Africa in peace and war. London: Miles & Miles, 1900. 191 pp. Plates. Portraits. Obl. 4°.

- NEVILLE, JOHN ORMOND. Boer and Britisher in South Africa; a history of the Boer-British war . . . together with biographies of the great men who made the history of South Africa. [Chicago]: The United subscription book publishers of America, 1900. xiii, 21-310, vi pp. Plates. Portraits. 8°.
- NORRIS, STEPHEN LESLIE. The South African war, 1899-1900; a military retrospect up to the relief of Ladysmith. London: J. Murray, 1900. xi, (1), 309 pp. Maps (partly folded). 8°.
- [O'CONNOR, THOMAS PATRICK.] Who ought to win? Oom Paul or Queen Victoria? A history of the Dutch-English settlement in South Africa from its origin to the present day; with letters . . . describing the . . . bravery of the Boer and British armies. By Spencer Randolph [*pseud.*]. Chicago: Laird & Lee, [1900]. 287 pp. Plates. Map. 12°.
- OMOND, GEORGE WILLIAM THOMSON. The Boers in Europe; a sidelight on history. London: A. & C. Black, 1903. (6), 277 pp. 12°.
- ON THE HEELS OF DE WET, by the Intelligence officer. 5th impression. Edinburgh and London: W. Blackwood and sons, 1902. vi, (2), 346 pp. Map. 12°.
- First published as a series of papers in Blackwood's magazine, 1902.
- OORDT, J. F. VAN. Paul Kruger en de opkomst der Zuid-Afrikaansche republiek. Amsterdam & Kaapstad: Hollandsch Afrikaansche uitgevers-maatschappij v/h. J. Dusseau & co., [1898]. (12), 904 pp. Frontispiece (portrait). 4°.
- PEARSE, HENRY H. S. Four months besieged; the story of Ladysmith; being unpublished letters from . . . the "Daily news" special correspondent. London, New York: Macmillan and co., 1900. xiv, 244 pp. Plates. Maps (partly folded). Frontispiece (portrait). 8°.
- *ed.* The history of Lumsden's Horse; a complete record of the corps from its formation to its disbandment. London, New York, and Bombay: Longmans, Green, and co., 1903. xii, 506 pp. Illustrations. Plates. Portraits. Folded map. 4°.
- PETTIGREW, RICHARD F. The South African republic. Speech in the Senate, April 14, 1900. Washington: [Government printing office], 1900. 27 pp. 8°.
- PHILLIPS, [FLORENCE]. Some South African recollections. London [etc.]: Longmans, Green, and co., 1899. x, 183 pp. Plates. 8°.
- PHILLIPS, THOMAS. The South African question. A lecture on "The Transvaal and its system of government," with some of the abuses of power which have led to the present war in South Africa. Philadelphia: Philadelphia journal, 1900. (22) pp. 12°.
- PINAAR, PHILIP. With Steyn and De Wet. London: Methuen & co., 1902. (6), 173, (1) pp. 12°.
- PIERCE, CHARLES DENIO. The South African republics. This souvenir is published for and in behalf of the Boer relief fund. New York, 1900. 48 pp. Illustrations. 4°.
- POIRIER, JULES. Le Transvaal (1652-1899). Préface de . . . A. Chuquet. Paris: C. Delagrave, [1900]. xxiv, 329 pp. Map. 12°.
- POWELL, BADEN FLETCHER SMYTH BADEN-. War in practice; some tactical and other lessons of the campaign in South Africa, 1899-1902.

With an introduction by Major-General R. S. S. Baden-Powell. London: Isbister & company, 1903. 280 pp. Plates. Plan. Diagrams. 12°. "Appendix: a typical position. Exemplifying difficulties of attack and uncertainties of defence," pp. 267-268.

PRUSSIA. *Grosser Generalstab. Kriegsgeschichtliche Abteilung.* The war in South Africa, prepared in the Historical section of the Great general staff, Berlin. Authorised translation by Colonel W. H. H. Waters. London: J. Murray, 1904. ix, 280 pp. Plates. Folded maps. 8°.

RALPH, JULIAN. *An American with Lord Roberts.* New York: F. A. Stokes co., [1901]. (2), 4, 314 pp. 12°.

Continuation of the author's "Toward Pretoria."

——— *Towards Pretoria; a record of the war between Briton and Boer to the relief of Kimberley.* New York: F. A. Stokes co., [1900]. viii, (2), 328 pp. Map. 12°.

——— *War's brighter side; the story of "The Friend" newspaper,* ed. by the correspondents with Lord Roberts's forces, March-April, 1900. With contributions from A. C. Doyle, R. Kipling, and others, and a letter from Earl Roberts. New York: D. Appleton and co., 1901. xvii, 471 pp. Plates. Portraits. Facsimiles. 12°.

[RANKIN, JAMES REGINALD LEA.] *A subaltern's letters to his wife . . .* 2d ed. (8th impression). London, New York, and Bombay: Longmans, Green and co., 1902. (8), 228 pp. 12°.

RIDPATH, JOHN CLARK, and EDWARD SYLVESTER ELLIS. *The story of South Africa; an account of the historical transformation of the dark continent by the European powers and the culminating contest between Great Britain and the South African Republic in the Transvaal war.* New York & Chicago: New England co., [1899]. (2), 641 pp. Illustrations. Plates. Portraits. Map. 8°.

ROBERTSON, John M. *Wrecking the empire.* London: G. Richards, 1901. xlv, 313 pp. 12°.

ROBINSON, CHARLES NAPIER, *ed.* *A pictorial history of South Africa and the Transvaal.* Ed. by Commander Chas. N. Robinson. [3d ed.] London: G. Newnes, [1900?]. 122 pp. Illustrations. Portraits. Maps. Frontispiece. 8°.

SCHREINER, OLIVE, "Mrs. Cronwright." *The South African question.* Chicago: C. H. Sergel co., 1899. 123 pp. 12°.

SEIDEL, AUGUST. *Transvaal, die Südafrikanische Republik. Historisch, geographisch, politisch, wirtschaftlich dargestellt . . .* 3. verb. und verm. Aufl. Berlin: Allgemeiner Verein für deutsche Litteratur, 1900. xv, 541 pp. Illustrations. Plates. Maps. 8°.

"Litteratur-Verzeichnis," pp. 462-487.

SHAFROTH, JOHN F. *The Boer war and the duty of the United States relative to the same. Speeches of Hon. John F. Shafroth, of Colorado, in the House . . .* February 1 and 7, 1900. Washington: [Government printing office], 1900. 16 pp. 8°.

SLEEPER, JOHN F. *The tocsin.* Reprinted from the 1st ed. of 1899. [Elizabeth, N. J.]: The Sherwood press, 1902. (6), xii, 42, (1) pp. 4°.

- SOUTH AFRICAN REPUBLIC. Boer version of the Transvaal war; or, An English translation of all Dutch official telegrams, received at Vryheid during Boer war up to the time when British troops occupied Vryheid [Sept. 19, 1900]. London: J. Barter, jnr., 1901. 95 pp. 8°.
- In double columns.
- STATHAM, F. REGINALD. Paul Kruger and his times. London: T. F. Unwin; Boston: L. C. Page & co., 1898. vii, 312 pp. Portrait. Map. 8°.
- [STEAD, WILLIAM THOMAS.] How Britain goes to war; a digest and an analysis of evidence taken by the Royal commission on the war in South Africa, compiled from the Blue books for the information of the public, by the author of "The truth about the navy." London: "Review of reviews" office, 1903. 256 pp. Portraits. 8°.
- The war in South Africa, 1899-19—? "Methods of barbarism." The case for intervention. London, [Henderson & Spalding], 1901. 96 pp. 8°.
- STEEVENS, GEORGE WARRINGTON. From Capetown to Ladysmith; an unfinished record of the South African war. Ed. by Vernon Blackburn. New York: Dodd, Mead & co., 1900. iii, 198 pp. Portrait. Map. 12°.
- STENOGRAPHIC REPORT of the Pro-Boer mass-meeting held at the People's church [St. Paul] January 6th, 1900. Thomas R. Kane's brilliant address: "History of the South African republics." From the Daily Volkszeitung, January 10, 1900. St. Paul, Minn. [St. Paul, 1900.] 61 pp. 24°.
- STERNBERG, ADELBERT WENCESLAUS HEINRICH LEOPOLD MARIA, *Graf von*. My experiences of the Boer war, by Count Sternberg; tr. from the German, with an introduction by Lieut.-Colonel G. F. R. Henderson . . . 2d impression. London, New York, etc.: Longmans, Green, and co., 1901. xlii, (2), 268 pp. 8°.
- STICKNEY, ALBERT. The Transvaal outlook. [n. p.], 1900. (4), 108 pp. Maps. Diagrams. 8°.
- STUART, JOHN. Pictures of war. Westminster: A. Constable & co., 1901. (6), 413, (1) pp. Folded maps. 8°.
- SULZER, WILLIAM. Government for the territory of Hawaii. The late Richard Parks Bland. Election of senators by the people. Sympathy for the Boers. Speeches of Hon. William Sulzer, of New York, in the House, April 4, 7, 12, and May 7, 1900. Washington: [Government printing office], 1900. 16 pp. 8°.
- The South African republic. Speech in the House, March 27, 1900. Washington: [Government printing office], 1900. 8 pp. 8°.
- THOMAS, C. H. Origin of the Anglo-Boer war revealed; the conspiracy of the 19th century unmasked. London: Hodder and Stoughton, 1900. viii, 215 pp. 12°.
- THOMSON, ADA. Memorials of Charles Dixon Kimber, lieut. 48th co., Imperial yeomanry, by his sister, Ada Thomson. London: J. Nisbet & co., 1902. viii, 249, (1) pp. Plates. Portraits. Map. 8°.
- THE TIMES, LONDON. Great Britain and the Dutch republics. Reprinted from the Times. London: G. E. Wright, 1900. (2), 60 pp. 24°.

- THE TRANSVAAL; a condensed history of the South African republic. Chicago and New York: Rand, McNally & co., [1899]. 60 pp. Illustrations. Map. 12°.
- TREADWELL, JAMES WILLWAY. American history of Transvaal Boers, gathered wholly from American authorities of public statistics and business men . . . also . . . Evils of government savings banks. San Francisco, 1899. 32, (17) pp. 8°.
- UNGER, FREDERIC WILLIAM. With "Bobs" and Krüger; experiences and observations of an American war correspondent in the field with both armies, illustrated from photographs taken by the author. Philadelphia: H. T. Coates and co., 1901. 10, 412 pp. Illustrations. Frontispiece. 8°.
- UNITED STATES. *Adjutant General's Office*. Reports on military operations in South Africa and China. July, 1901. Washington: Government printing office, 1901. 600 pp. Folded maps. 8°. (Military information series, no. 33.) "Extracts from the reports of Captain S. L'H. Slocum, on the operations of the British army," pp. 7-92; "Extracts from the report of Captain Carl Reichmann, on the operations of the Boer army," pp. 93-259; "Brief summary of military operations in South Africa," pp. 261-325.
- 56th Congress, 1st session. Senate document no. 386. Papers relating to war in South Africa; presented by Mr. Teller. May 21, 1900. 36 pp. 8°.
- VAINCRE OU MOURIR; LA GUERRE AU TRANSVAAL. Photographies prises sur le champ de bataille. [Paris: Librairie Nilsson, etc., 1901.] 32 pp. Illustrations. F°. Cover-title.
- [VAN DER HOOGT, CORNELIUS W.] *ed.* A century of injustice; synopsis of a message to the people of South-Africa, sent by the government of the South-African Republic. An earnest representation and historical reminder to . . . Queen Victoria . . . in view of the prevailing crisis, by P. J. Joubert . . . A proclamation to the burghers of the Orange Free State, by M. J. Stein. . . . preceded by The struggle of our brethren in South-Africa to maintain their independence . . . by C. W. Van der Hoogt. Baltimore, 1899. 119 pp. Portraits. 8°.
- The story of the Boers narrated by their own leaders, prepared under the authority of the South African republics . . . preceded by The policy of mediation, by M. White. New York & London: Harper & bros., 1900. vi, (4), 284, (2) pp. Plates. Portraits. Map. 12°. A new and revised edition of "A century of injustice."
- VILJOEN, BENJAMIN JOHANNIS. My reminiscences of the Anglo-Boer war. Popular ed. St. Louis, Mo.: Becktold printing & book mfg. co., [1905]. 12, 17-312 pp. 8°.
- VILLEBOIS DE MAREUIL, GEORGES HENRI ANNE MARIE VICTOR DE. War notes; the diary of Colonel de Villebois-Mareuil, from November 24, 1899, to March 7, 1900; authorised translation from the Paris Liberté, by Frederick Lees, with a preface by E. M. de Vogüé. London: A. and C. Black, 1901. xx, 282, (1) pp. 12°.

- WAR AGAINST WAR IN SOUTH AFRICA. Ed. by W. T. Stead. nos. 1-30; Oct. 20, 1899-August 10, 1900. [London], 1899-1900. 1 vol. Illustrations. 4°. Weekly, Oct., 1899-Apr., 1900; monthly, June-Aug., 1900.
- Supplement . . . Mar. 9, 1900. "Stop the war" conference in Exeter Hall. Full report of the proceedings . . . [London, 1900]. 4 pp. 42cm. fold. to 28cm. (*With War against war in South Africa.* [London], 1899-1900. 4°.)
- Supplement . . . June 1, 1900. "Stop the war" meeting in the Memorial Hall, May 24, 1900. Full report of the proceedings. [London, 1900.] 4 pp. 44 cm. fold. to 28 cm. (*With War against war in South Africa.* [London, 1899-1900]. 4°.)
- WELLINGTON, GEORGE L. The war in South Africa. Speech in the Senate . . . May 28, 1900. Washington: [Government printing office], 1900. 20 pp. 8°.
- WESTLAKE, JOHN. The Transvaal war; a lecture delivered in the University of Cambridge on 9th November, 1899. 2d ed. London: C. J. Clay & sons, 1899. (4), 35 pp. 8°.
- WILKINSON, HENRY SPENSER. War and policy; essays. New York: Dodd, Mead & co., 1900. xv, 443 pp. Maps. 8°.
- Contents.*—1. Military history.—2. Art of war.—3. Problems of policy.—4. National defence.—5. South African war.
- WILLCOCKS, *Sir* WILLIAM. Three months in South Africa. A lecture delivered at the Century club, Cairo, on the 28th January, 1902. Cairo: National printing department, 1902. 46 pp. 8°.
- WILLIAMS, CHARLES. Hushed up: a case for inquiry into some suppressed facts concerning the conduct of the war in South Africa. [London]: G. Richards, 1902. 106 pp. 12°.
- WILLIAMS, HUGH, and FREDERICK CHARLES HICKS, *ed.* Selected official documents of the South African Republic and Great Britain. A documentary perspective of the causes of the war in South Africa. Philadelphia: American academy of political and social science, 1900. 72 pp. 8°. (American academy of political and social science. *Annals.* Supplement. July, 1900.)
- WILSON, HERBERT WRIGLEY. After Pretoria: the guerilla war. The supplement to "With the flag to Pretoria." With many illustrations, mainly from photographs taken at the seat of war. [London]: The Amalgamated press, 1902. 2 vols. Illustrations. Portraits. Maps. F°. "Forming vol. III [and IV] of the complete work."
- With the flag to Pretoria. A history of the Boer war of 1899-1900. London: Harmsworth bros., 1900-1901. 2 vols. Illustrations. Portraits. Maps. F°.
- WILSON, WILLIAM LAWLER. England and the Transvaal: the case for intervention. An Englishman's appeal and address to the English people. [4th ed.] London: The Grosvenor press, 1899. 52 pp. Map. 8°.
- WISSER, JOHN PHILIP. The second Boer war. 1899-1900. Kansas City, Mo.: Hudson-Kimberly pub. co., 1901. 270 pp. Illustrations. Portfolio of maps. 8°.

YOUNGHUSBAND, FRANCIS EDWARD. South Africa of to-day. London, New York: Macmillan and co., 1898. vii, (1), 177, (1) pp. Plates. Portrait. 8°. Originally published as a series of letters in the London Times.

——— *Same*. London, New York: Macmillan and co., 1899. lx, (3), 258 pp. Plates. Portrait. 12°.

ZUM TRANSVAAL-KRIEG. Weltfriede(!) (eine Bitte an England). [n. p., 1900.] 16 pp. 8°.

BRITISH PARLIAMENTARY PAPERS.

GREAT BRITAIN. *Admiralty*. South Africa (Naval brigade). "Copies of despatches in regard to the naval brigade in South Africa, which were published in the 'London Gazette' of the 12th instant." Ordered, by the House of Commons, to be printed, 29 April, 1901. London [1901]. 58 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 42. 142.)

——— South Africa (Transports). Return showing the name, tonnage, and speed of each vessel employed to convey troops to South Africa since the 1st day of July last, the date and port of her departure from these shores, and arrival at Cape Town, Durban, or elsewhere [etc., etc.]. Ordered, by the House of Commons, to be printed, 22 May, 1900. London, 1900. 16 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 51. 184.)

——— South Africa (Transports). Return showing the name, tonnage, and speed of each vessel employed to convey troops to South Africa since the 1st day of April, 1900, and up to and ending 31st day of March, 1901. Ordered, by the House of Commons, to be printed, 17 August, 1901. London [1901]. 11 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 42. 374.)

——— *Same*. Since the 1st day of April, 1901, and up to and ending 31st day of March, 1902. London, 1902. F°. (Great Britain. Parliament. Sessional papers, 1902. 360.) ^a

——— Transports (South African war). Return "giving the names of all transports hired for the conveyance of troops, stores, and material to South Africa in 1899, 1900, 1901, and 1902. Ordered, by the House of Commons, to be printed, 13 August, 1903. London, 1903. 57 pp. F°. (Great Britain. Parliament. Sessional papers, 1903. 354.)

——— *Army*. See GREAT BRITAIN. *War department*.

——— *Colonial office*. South African Republic. Correspondence on the subject of the recent disturbances in the South African Republic. Presented to both Houses of Parliament by command of Her Majesty. February, 1896. London, 1896. xix, 93 pp. F°. (Great Britain. Parliament. Sessional papers, 1896, vol. 59. C. 7933.)

——— Correspondence relating to affairs in the South African Republic. Presented to both Houses of Parliament by command of Her Majesty. April, 1896. London, 1896. xiii, 174 pp. F°. (Great Britain. Parliament. Sessional papers, 1896, vol. 59. C. 8063.)

^a Not in the Library of Congress at present.

- GREAT BRITAIN. *Colonial office*. South African Republic. Papers relating to the commandeering of British subjects in the South African Republic in 1894, and the visit of the High commissioner to Pretoria. Presented to both Houses of Parliament by command of Her Majesty. July, 1896. London, 1896. v, 53 pp. F°. (Great Britain. Parliament. Sessional papers, 1896, vol. 59. C. 8159.)
-
- Correspondence regarding the imprisonment at Pretoria of Mr. W. D. Davies and Captain Woolls Sampson. Presented to both Houses of Parliament by command of Her Majesty. February, 1897. London, 1897. v, 28 pp. F°. (Great Britain. Parliament. Sessional papers, 1897, vol. 62. C. 8346.)
-
- Further correspondence relating to affairs in the South African Republic. Presented to Parliament by command of Her Majesty. April, 1897. London, 1897. xv, 141 pp. F°. (Great Britain. Parliament. Sessional papers, 1897, vol. 62. C. 8423.)
-
- Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. February, 1898. London, 1898. 59 pp. F°. (Great Britain. Parliament. Sessional papers, 1898, vol. 60. C. 8721.)
-
- Papers relating to the complaints of British subjects in the South African Republic. Presented to both Houses of Parliament by command of Her Majesty. June, 1899. London, 1899. xii, 243 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9345.)
-
- Correspondence relating to the Bloemfontein conference, 1899. Presented to both Houses of Parliament by command of Her Majesty. July, 1899. London, 1899. (4), 66 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9404.)
-
- Further correspondence relating to proposed political reforms in the South African Republic. Presented to both Houses of Parliament by command of Her Majesty. July, 1899. London, 1899. x, 74 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9415.)
-
- Correspondence relating to the status of the South African Republic. Presented to both Houses of Parliament by command of Her Majesty. August, 1899. London, 1899. 34 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9507.)
-
- Same*. Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. August, 1899. London, 1899. vi, 76 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9518.)
-
- Same*. Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. September, 1899. London, 1899. viii, 65 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9521.)
-
- Same*. Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. October, 1899. London, 1899. viii, 70 pp. F°. (Great Britain. Parliament. Sessional papers, 1899, vol. 64. C. 9530.)

GREAT BRITAIN. *Colonial office*. South African Republic. *Same*. Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. January, 1900. London, 1900. xiii, 253 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 43.)

————— *Same*. Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. July, 1900. London, 1900. xi, 193 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 261.)

————— South Africa. Correspondence relating to the despatch of colonial military contingents to South Africa. Presented to both Houses of Parliament by command of Her Majesty. November, 1899. London, 1899. x, 28 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 18.)

————— Natal. Correspondence relating to the defense of Natal. Presented to both Houses of Parliament by command of Her Majesty. January, 1900. London, 1900. 26 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 44.)

————— Cape Colony. Correspondence relating to affairs of the Cape Colony. Presented to both Houses of Parliament by command of Her Majesty. July, 1900. London, 1900. iv, 44 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 264.)

————— South Africa. Correspondence relating to the recent political situation in South Africa. Presented to both Houses of Parliament by command of Her Majesty. August, 1900. London, 1900. (4), 19 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 369.)

————— *Same*. Further correspondence. Presented to both Houses of Parliament by command of Her Majesty. December, 1900. London, 1900. v, 122 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 420.)

————— Further correspondence relating to affairs in South Africa. Presented to both Houses of Parliament by command of His Majesty. April, 1901. London, 1901. 77 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 547.)

————— Correspondence relating to proposed additions of territory to Natal. Presented to both Houses of Parliament by command of His Majesty. May, 1902. London, 1902. 12 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 941.)

————— Further correspondence relating to affairs in South Africa. Presented to both Houses of Parliament by command of His Majesty. January, 1902. London, 1902. x, 202 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 903.)

————— Cape Colony. Petition for the temporary suspension of the Cape constitution and reply of His Majesty's government. Presented to both Houses of Parliament by command of His Majesty. July, 1902. London, 1902. 9 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 1162.)

- GREAT BRITAIN. *Colonial office*. South Africa. Papers relating to an interview between the Secretary of state for the colonies and Generals Botha, De Wet, and De La Rey, on September 5th, 1902. Presented to both Houses of Parliament by command of His Majesty. September, 1902. London, 1902. 24 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 1284.)
- Correspondence relating to the appeal of the Boer generals to the civilized world. Presented to both Houses of Parliament by command of His Majesty. November, 1902. London, 1902. 11 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 1329.)
- *Concentration camps commission*. Report on the concentration camps in South Africa, by the Committee of ladies appointed by the Secretary of state for war; containing reports on the camps in Natal, the Orange river colony, and the Transvaal. Presented to Parliament by command of His Majesty. London, 1902. (2), 208 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 893.)
- *Foreign office*. Africa. No. 1 (1902). Correspondence with the Netherland government regarding the war in South Africa. Presented to both Houses of Parliament by command of His Majesty. February, 1902. London, [1902]. (2), 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 906.)
- Africa. No. 2 (1900). Correspondence with the Presidents of the South African republic and of the Orange Free state respecting the war. Presented to both Houses of Parliament by command of Her Majesty. March, 1900. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 35.)
- *High commissioner for South Africa*. South Africa. Notice issued, on 26th January, 1900, relating to forfeitures, &c., of property situated in the South African republic or in the Orange Free state, declared subsequently to 10th October, 1899. Presented to both Houses of Parliament by command of Her Majesty. February, 1900. London, 1900. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 53.)
- Proclamation issued on 19th March, 1900, relating to alienations of property by the governments of the South African Republic or Orange Free State. Made subsequently to the date of the proclamation. Presented to both Houses of Parliament by command of Her Majesty. April, 1900. London, 1900. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 128.)
- *Royal commission on martial-law sentences, South Africa*. South Africa, 1902. Report of the Royal commission appointed to inquire into sentences passed under martial law. Presented to both Houses of Parliament by command of His Majesty. November, 1902. London, 1902. v, 63 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 1364.)
- *Royal commission on South African hospitals*. Report of the Royal commission appointed to consider and report upon the care and treatment of the sick and wounded during the South African cam-

paign. Presented to both Houses of Parliament by command of Her Majesty. London, 1901. vi, 71 pp. F°. (Great Britain. Parliament. Sessional papers, 1901. Cd. 453.)

Minutes of evidence taken before the Royal commission appointed to consider and report upon the care and treatment of the sick and wounded during the South African campaign. Presented to both Houses of Parliament by command of Her Majesty. London, 1901. lii, (2), 565 pp. F°. (Great Britain. Parliament. Sessional papers, 1901. Cd. 454.)

Appendix to Minutes of evidence. Presented to both Houses of Parliament by command of Her Majesty. London, 1901. (2), 368 pp. F°. (Great Britain. Parliament. Sessional papers, 1901. Cd. 455.)

Royal commission on the war in South Africa. Report of His Majesty's commissioners appointed to inquire into the military preparations and other matters connected with the war in South Africa. Presented to both Houses of Parliament by command of His Majesty. London, 1903. viii, 316 pp. F°. (Great Britain. Parliament. Sessional papers, 1903. Cd. 1789.)

Minutes of evidence taken before the Royal commission on the war in South Africa. Presented to both Houses of Parliament by command of His Majesty. London, 1903. 2 vols. F°. (Great Britain. Parliament. Sessional papers, 1903. Cd. 1790-1791.)

Appendices to the Minutes of evidence taken before the Royal commission on the war in South Africa. Presented to both Houses of Parliament by command of His Majesty. London, 1903. (1), 445 pp. F°. (Great Britain. Parliament. Sessional papers, 1903. Cd. 1792.)

Select committee on the Jameson raid. South African Republic. Report of the Select committee of the Cape of Good Hope, House of Assembly, on the Jameson raid into the territory of the South African republic. Presented to Parliament by command of Her Majesty. March, 1897. London, 1897. iv, 300 pp. F°. (Great Britain. Parliament. Sessional papers, 1897, vol. 62. C. 8404.)

Transval concession commission. Report. Dated 19th April, 1901. Presented to both Houses of Parliament by command of His Majesty. June, 1901. London, 1901. 161 pp. Folded plan. F°.

Same. Part II. Minutes of evidence. Presented to both Houses of Parliament by command of His Majesty. June, 1901. London, 1901. iv, 268 pp. F°.

Same. Part III. Appendix of documents. Presented to both Houses of Parliament by command of His Majesty. June, 1901. London, 1901. 315 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 35. Cd. 623, 624, 625.)

Treasury. Wars in South Africa and China (cost and expenditures). Return "of estimated cost of wars in South Africa and China, showing how the expenditure is to be met." Ordered, by the House of Commons, to be printed, 2 May, 1901. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 37, 150.)

GREAT BRITAIN. *Treasury*. Wars in South Africa and China (cost and expenditures). Return "showing (1) the estimated amount of war charges in South Africa and China, which will be incurred up to 31st March, 1903; (2) how these charges have been or will be met; and (3) how the money borrowed has been raised." Ordered, by the House of Commons, to be printed, 24 April, 1902. London, 1902. 5 pp. F°. (Great Britain. Parliament. Sessional papers, 1902, 155.)

————— Return "showing (1) the estimated amount of war charges in South Africa and China incurred up to the 31st day of March, 1903; (2) how these charges have been met; and (3) how the money borrowed has been raised." Ordered, by the House of Commons, to be printed, 29 April, 1903. London, 1903. 5 pp. F°. (Great Britain. Parliament. Sessional papers, 1903, 130.)

————— *War department*. Imperial yeomanry. "Return showing the number of companies of Imperial yeomanry that have been formed, the names of the regiments and of the countries from which each company has been raised, the number that have embarked with horses, and the number that have left either wholly or partially without horses." Ordered, by the House of Commons, to be printed, 30 March, 1900. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49, 115.)

————— South African war. Telegrams from Field-marshal Lord Roberts, reporting (1) a telegram addressed by him to the State presidents of the Orange Free State and South African Republic, in reference to the abuse of the white flag, and (2) the reply of the President of the Orange Free State. Presented to Parliament by Her Majesty's command, April, 1900. London, 1900. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 122.)

————— Army (war in South Africa). Telegrams relating to the publication of despatches. Presented to Parliament by Her Majesty's command, May, 1900. London, 1900. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49. Cd. 155.)

————— "Return showing the names of members of either House of Parliament at present serving, or under orders to serve, Her Majesty in South Africa, the capacity in which they serve, and the dates at which they sailed or are under orders to sail." Ordered, by the House of Commons, to be printed, 2 May, 1900. London [1900]. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49. 158.)

————— Telegrams respecting hospital arrangements for the troops in South Africa. Presented to Parliament by command of Her Majesty. London, 1900. 4 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 230.)

————— Medical and sanitary arrangements at the Cape. "Return of correspondence between the Honourable Member for Ilkeston and the War department in relation to medical and sanitary arrangements at the Cape." Ordered, by the House of Commons, to be printed, 17 July, 1900. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49. 279.)

GREAT BRITAIN. *War department.* "Return of the number of officers and men who since the commencement of the present war have died or been invalided home from causes other than wounds received in action." Ordered, by the House of Commons, to be printed, 11 July, 1900. London, 1900. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49. 268.)

——— Statement of stores transferred from navy to land service for South Africa up to 31st December, 1899. Presented to Parliament by Her Majesty's command, July, 1900. London, 1900. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49. Cd. 279.)

——— Return of military forces in South Africa, 1899-1900. Presented to Parliament by Her Majesty's command. London, 1900. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 49. Cd. 421.)

——— *Same.* 1899-1901. Presented to Parliament by command of His Majesty. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 39. Cd. 462.)

——— Proclamations issued by Field-marshal Lord Roberts in South Africa. Presented to Parliament by Her Majesty's command. London, 1900. 23 pp. F°. (Great Britain. Parliament. Sessional papers, 1900, vol. 56. Cd. 426.)

——— South Africa despatches. Vol. 1, 2, Supplementary. Presented to Parliament by command of His Majesty. London, 1901. 3 vols. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 457, 458, 463.) Continued by: Despatch by General Lord Kitchener, dated 8th March, 1901. 16 pp. (Sessional papers, 1901, vol. 47. Cd. 522.)

——— *Same.* Dated 8th May, 1901. 36 pp. (Sessional papers, 1901, vol. 47. Cd. 605.)

——— *Same.* Dated 8th July, 1901. 42 pp. (Sessional papers, 1901, vol. 47. Cd. 695.)

——— *Same.* Dated 8th August, 8th September, and 8th October, 1901. 68 pp. (Sessional papers, 1902, vol. 69. Cd. 820.)

——— *Same.* Dated 8th November, 1901. 11 pp. (Sessional papers, 1902, vol. 69. Cd. 823.)

——— *Same.* Dated 8th December, 1901. 23 pp. (Sessional papers, 1902, vol. 69. Cd. 824.)

——— *Same.* Dated 8th January, 1902. 12 pp. (Sessional papers, 1902, vol. 69. Cd. 890.)

——— *Same.* Dated 8th February, 1902. 12 pp. (Sessional papers, 1902, vol. 69. Cd. 965.)

——— *Same.* Dated 8th March, 1902. 24 pp. (Sessional papers, 1902, vol. 69. Cd. 970.)

——— *Same.* Dated 8th April, 1902. 14 pp. (Sessional papers, 1902, vol. 69. Cd. 984.)

——— *Same.* Dated 1st June, 1902. 23 pp. (Sessional papers, 1902, vol. 69. Cd. 986.)

——— *Same.* Dated 23rd June, 1902. 41 pp. (Sessional papers, 1902, vol. 69. Cd. 988.)

- GREAT BRITAIN. *War department.* Correspondence between Field-Marshal Lord Roberts, Commanding in Chief South Africa field force, and Acting commandant-general Louis Botha, dated 12th, 13th, 14th, and 15th June, 1900. Presented to Parliament by command of His Majesty. London, 1901. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 461.)
- Correspondence relative to the recall of Major-General Sir H. E. Colville, K. C. M. G., C. B. Presented to Parliament by command of His Majesty. London, 1901. 6 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 467.)
- Return of military forces in South Africa. Oversea colonial contingents. Presented to Parliament by command of His Majesty. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 39. Cd. 469.)
- Finding of a court of enquiry held at Barberton on 25th September, 1900, to investigate the circumstances under which Lieutenant-Colonel B. E. Spragge, D. S. O., XIIIth Bn. Imperial Yeomanry, and others, became prisoners of war. Presented to Parliament by command of His Majesty. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 470.)
- Report by Lieut.-General Sir H. E. Colville, on the operations of the ninth division at Paardeberg. Presented to Parliament by command of His Majesty. London, 1901. 10 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 520.)
- South Africa. Return of buildings burnt in each month from June, 1900, to January, 1901, including farm buildings, mills, cottages, and hovels. Presented to Parliament by command of His Majesty. London, [1901]. 19 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 524.)
- Papers relating to negotiations between Commandant Louis Botha and Lord Kitchener. Presented to both Houses of Parliament by command of His Majesty. March, 1901. London, 1901. 7 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 528.)
- Further papers relating to negotiations between Commandant Louis Botha and Lord Kitchener. Presented to both Houses of Parliament by command of His Majesty. July, 1901. London, 1901. iv, 18 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 663.)
- Letter from Commander Louis Botha to Lord Kitchener, dated 13th February, 1901. Presented to both Houses of Parliament by command of His Majesty. April, 1901. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 546.)
- Return of military forces in South Africa, 1899-1901. Presented to Parliament by command of His Majesty. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 39. Cd. 578.)

- GREAT BRITAIN. *War department.* Correspondence, etc., between the Commander-in-Chief in South Africa and the Boer commanders so far as it affects the destruction of property. Presented to both Houses of Parliament by command of His Majesty, June, 1901. London, 1901. 13 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 582.)
- South Africa. Return of numbers of persons in the concentration camps in South Africa, June, 1901. Presented to Parliament by command of His Majesty. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 608.)
- Strength of volunteer service companies and drafts embarked for South Africa in 1900. Presented to Parliament by command of His Majesty. London, 1901. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 40. Cd. 610.)
- South Africa. Report from Brigadier-general Dixon on the operations at Vlaktefontein on 29th May, 1901. Presented to Parliament by command of His Majesty. London, 1901. 4 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 693.)
- Further return of numbers of persons in the camps of refuge in South Africa, July, 1901. Presented to Parliament by command of His Majesty. London, 1901. (3) pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 694.)
- *Same.* Further return. August, 1901. London, 1902. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 789.)^a
- South Africa. Correspondence relating to the prolongation of hostilities in South Africa. Presented to both Houses of Parliament by command of His Majesty. August, 1901. 7 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 732.)
- Proclamation issued by Lord Kitchener, as administrator of the Transvaal, on 1st July, 1901, respecting payments under contracts to purchase or lease land or mining rights, &c., entered into prior to the war. Presented to both Houses of Parliament by command of His Majesty, August, 1901. London, 1901. 4 pp. F°. (Great Britain. Parliament. Sessional papers, 1901, vol. 47. Cd. 781.)
- Return of numbers of persons in the concentration camps in South Africa, September, 1901. London, 1902. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 793.)^a
- Reports, &c., on the working of the refugee camps in the Transvaal, Orange River Colony, Cape Colony, and Natal. Presented to both Houses of Parliament by command of His Majesty. November, 1901. London, 1901. 387 pp. Folded sheet. F°. (Great Britain. Parliament. Sessional papers, 1902, vol. 68. Cd. 819.)
- Further papers relating to the working of the refugee camps. Presented to both Houses of Parliament by command of His Majesty, December, 1901. London, 1901. 131 pp. F°. (Great Britain. Parliament. Sessional papers, 1902, vol. 68. Cd. 853.)

^a Not in the Library of Congress at present.

GREAT BRITAIN. *War department. Reports, &c. Same.* Further papers. Presented to both Houses of Parliament by command of His Majesty, January, 1902. London, 1902. 134 pp. F°. (Great Britain. Parliament. Sessional papers, 1902, vol. 68. Cd. 902.)

————— *Same.* Further papers. Presented to both Houses of Parliament by command of His Majesty, February, 1902. London, 1902. 103 pp. F°. (Great Britain. Parliament. Sessional papers, 1902, vol. 68. Cd. 934.)

————— *Same.* Further papers. Presented to both Houses of Parliament by command of His Majesty, March, 1902. London, 1902. 32 pp. F°. (Great Britain. Parliament. Sessional papers, 1902, vol. 68. Cd. 936.)

————— Return of the numbers of troops and horses that have embarked for South Africa from 1st January, 1900, to 31st December, 1901. London, 1902. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 884.)^a

————— Returns of military forces in South Africa, 1899–1902. London, 1902. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 892.)^a

————— South Africa. Petition from Boer prisoners of war at Bermuda. Presented to both Houses of Parliament by command of His Majesty, January, 1902. London, 1902. (2), 2 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 921.)

————— Letter from Assistant-general Tobias Smuts to Commandant-general L. P. Botha. Presented to both Houses of Parliament by command of His Majesty, February, 1902. London, 1902. 4 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 933.) "Letter found among papers recently captured, and sent home by the Field intelligence department, South Africa."

————— Statistics of the refugee camps in South Africa. Presented to both Houses of Parliament by command of His Majesty, April, 1902. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 939.)^a

————— Statistics of the refugee camps in South Africa. Presented to both Houses of Parliament by command of His Majesty, May, 1902. London, 1902. 5 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 942.)

————— I. Tender of M. Bergl & co., dated 6th January, 1902, for supply of meat to troops in South Africa. II. Letter of undertaking, dated 27th January, 1902, as to source of supply of meat. III. Letter of acceptance, signed by Director of army contracts, dated 27th January, 1902. Presented to Parliament by command of His Majesty. London, 1902. 7 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 961.)

————— Army (remounts). Reports, statistical tables, and telegrams received from South Africa, June, 1899, to January 22, 1902. Presented to Parliament by command of His Majesty. London, 1902. 56 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 963.)

^a Not in the Library of Congress at present.

- GREAT BRITAIN. *War department*. I. Tender of the Imperial cold-storage and supply company, limited, dated 4th March, 1902, for supply of meat to troops in South Africa. II. Letter of undertaking, dated 4th March, 1902, as to source of supply of meat. III. Letter of acceptance, signed by Director of army contracts, dated 12th March, 1902. London. 1902. 7 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 964.)
-
- Army (volunteer force). Comparative statement, showing the increase and decrease during the last quarters of 1900 and 1901. Presented to Parliament by command of His Majesty. London, 1902. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 966.)
-
- South Africa. Report from Lieut.-General Lord Methuen on the action that took place near Tweebosch on 7th March, 1902. Presented to Parliament by command of His Majesty. London, 1902. 6 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 967.)
-
- The Spion Kop despatches. Presented to Parliament by command of His Majesty. London, 1902. 48 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 968.)
-
- Return of farm buildings, &c., in Cape Colony and Natal, destroyed by the Boers. Presented to Parliament by command of His Majesty. London, 1902. 6 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 979.)
-
- Papers relating to the administration of martial law in South Africa. Presented to Parliament by command of His Majesty. London, 1902. 297 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 981.)
-
- *Same*. (In continuation of Cd. 981.) London, 1903. 156 pp. F°. (Great Britain. Parliament. Sessional papers, 1903. Cd. 1423.)
-
- South Africa. Telegrams concerning the siege of Ladysmith. Presented to Parliament by command of His Majesty. London, 1902. 4 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 987.)
-
- Return of military forces in South Africa, 1899-1902. Presented to Parliament by command of His Majesty. London, 1902. (4) pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 990.)
-
- Army expenditures, 1902-3. (South African war.) Statement showing approximately the revised amounts. Presented to Parliament by command of His Majesty. London, 1902. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 996.)
-
- South Africa. Correspondence respecting terms of surrender of the Boer forces in the field. Presented to both Houses of Parliament by command of His Majesty. June, 1902. London, 1902. (2), 13 pp. F°. (Great Britain. Parliament. Sessional papers, 1902. Cd. 1096.)
-
- Letter from General officer commanding the forces in South Africa transmitting the proceedings of a Board of officers assembled to report upon certain supplies of "meat and vegetable" rations at Pre-

toria considered to be unfit for issue. Presented to Parliament by command of His Majesty. London, 1903. 7 pp. F°. (Great Britain. Parliament. Sessional papers, 1903. Cd. 1499.)

GREAT BRITAIN. *War department*. "Return of Military expeditions in which British or native troops have been employed during the last ten years." Ordered, by the House of Commons, to be printed, 7 April, 1903. London, 1903. 3 pp. F°. (Great Britain. Parliament. Sessional papers, 1903. 108.)

RED CROSS. Great Britain. Central British Red cross committee. Report by the Central British Red cross committee on voluntary organizations in aid of the sick and wounded during the South African war. London: Harrison and sons, 1902. vi, 209 pp. Plates. Folded plans. F°.

DUTCH DOCUMENTS.

GREAT BRITAIN AND SOUTH AFRICAN REPUBLIC. Correspondentie van de Zuid-Afrikaansche Republiek met betrekking tot het staatsmonopolie voor vervaardiging, enz. van kruit, ammunitie, dynamiet en alle andere ontplofbare stoffen. Pretoria: Staatsdrukkerij, 1899. (2), 18 pp. F°. [No. 7, 1899.] Part of the text also in English.

Correspondentie van de Zuid-Afrikaansche Republiek met betrekking tot eenige wetten en tractaten in verband met de Conventie van Londen van 1884. [Pretoria]: Staatsdrukkerij, 1898. (4), 66, (8) pp. F°. [No. 2, 1898.] Part of the text also in English.

Correspondentie van de Zuid-Afrikaansche Republiek met betrekking tot de crimineele jurisdictie van het hooggerechtshof van Swazieland naar aanleiding van den dood van den Induna M'Baba en anderen in verband met de Conventie van Volksrust van 1894. Pretoria: Staatsdrukkerij, 1899. (2), ii, 59 pp. F°. [No. 2, 1899.] The most of the text also in English in parallel columns.

Correspondentie van de Zuid-Afrikaansche Republiek met betrekking tot de aanstelling van een consul-general der Zuid-Afrikaansche Republiek te Kaapstad. Pretoria: Staatsdrukkerij, 1899. 13 pp. F°. [No. 3, 1899.] Part of the text also in English.

Verdere correspondentie van de Zuid-Afrikaansche Republiek met betrekking tot eenige wetten en traktaten in verband met de Conventie van Londen van 1884. Pretoria: Staatsdrukkerij, 1899. 10 pp. F°. [No. 5, 1899, Vervolg op no. 2, 1898.] Part of the text also in English.

Officieele bescheiden gewisseld met de Engelsche regeering in zake de Conventie van Londen gesloten den 27sten Februari 1884 . . . Amsterdam: J. H. Kruyt, 1884. viii, 100 pp. Fold. map. F°. Text also in English.

Officieele bescheiden betreffende de conventie gesloten te Pretoria dd. 2 Augustus 1890. Geratificeerd bij volksraadsbesluit art 1204, dd. 7 Augustus 1890. [Pretoria:] Staatsdrukkerij, 1890. viii, 63 pp. F°. [No. 1, 1890.]

Notulen der verrichtingen van de conferentie op 31 Mei 1899 en volgende dagen to Bloemfontein . . . gehouden tusschen . . . den Staatspresident van de Zuid-Afrikaansche Republiek en . . . den Hoogen commissaris. Pretoria: Staatsdrukkerij, 1899. 54 pp. F°. [No. 4, 1899.]

ADDITIONAL TITLES.

- HARDING, WILLIAM. War in South Africa and the Dark Continent from savagery to civilization. The strange story of a weird world from the earliest ages to the present, including the war with the Boers. [Chicago? 1902.] (4), 11-554 pp. Plates. Portraits. 8°.
- METHUEN, ALGERNON MARSHALL STEDMAN. Peace or war in South Africa. 8th ed., rev. and enlarged. <18th thousand.> London: Methuen & co., 1901. xiv, 280 pp. Maps. 12°.
- STARK, JAMES H. The British and Dutch in South Africa. Boston: James H. Stark, 1900. 32 pp. 12°. Cover-title.

INDEX.

A.

- Abdominal bandage, 61.
- Advance posts at Talana Hill, 81.
- Algerian campaigns, tactics of, 78, 79.
- Allen, Lieut. Chas. M., translation, 73.
- Ambulances, color of, 55.
- American generals, opinion of maneuvers, 10.
- Ammunition pouches, 62, 65.
- Armament; Lindenau's opinion on, 11.
- Armament of infantry and cavalry, 66, 67, 92, 140.
- Arms of officers, 65, 57, 104.
- Articles of cavalry equipment, 65, 66.
- Artillery:
 - Artillery duel, 35, 36, 37, 45.
 - Breakfontein, 33.
 - Colenso, 36, 37, 44, 48, 143, 146, 199.
 - Description of combat of, 29, 44, 98.
 - Effect on advance of skirmish line, 18, 41.
 - Effect on troops behind cover, 34, 98.
 - Employment by the Boers, 30, 37, 41, 197.
 - Employment by the English, 30, 37, 39, 41, 42, 43, 87, 102, 122, 148, 197.
 - Glencoe, Elandslaagte, Rietfontein, 26, 142.
 - In South African war, 21, 41, 47, 197.
 - Magersfontein, 27, 43, 48, 158, 199.
 - Matériel in South Africa, 23, 24, 140.
 - Mobility of, 35.
 - Mooi River, 31, 32.
 - Observations of Captain Wilson on, 31.
 - On the Tugela, 28, 124.
 - Reserve, 35.
 - Screens, 49.
 - Shields, 25, 37, 38, 140, 198.
 - Spion Kop, 28, 31, 151, 153.
 - Vaal Krantz, 31, 34, 36, 37, 43, 122.
 - With Cronje on the Modder, 27.
- Atmospheric transparency, 32, 125.
- Attack:
 - Bayonet, 122, 137.
 - Boer; description of Captain Gilbert, 29.

Attack—Continued.

- Boer; description of a German officer, 30, 41.
- Boguslawski's opinion of the, 15, 127, 172, 196.
- Bonnal's opinion of, 74, 75, 76, 82, 88, 89, 110.
- By groups, 12, 87, 116, 127, 173, 189, 202.
- Cavalry, 99, 100, 101, 102, 142, 199.
- During war of 1870, 17, 18, 79, 86, 98, 128, 152.
- English, 6, 82, 83, 122, 141, 142, 165, 168.
- Frontal, 7, 9, 10, 41, 88, 89, 95, 111, 121, 163, 202.
- German, 172, 183.
- Gilbert's opinion of, 29, 42, 43, 44, 49, 112.
- Hohenlohe's opinion of the, 18, 112.
- Lindenau's form of, 11, 114.
- Modern method of, 13, 16, 19, 40, 41, 49, 172, 188, 202.
- Night, 122, 132, 134, 150, 161.
- Observations of Captain Gilbert, 42, 43, 44, 47, 49, 50.
- Opinion of General Langlois on, 43, 45, 46, 47, 48.
- Scherff's opinion of the, 12, 114.
- Screens of, 49.
- Shrapnel, 32, 37, 38, 40, 41, 45, 47.
- Shields, 25, 37, 30, 38, 140, 198.
- Stieler's opinion of the, 12, 115.
- Waldersee method, 166, 189.

Assault, 184, 202.

Austrian tactical regulations, 169.

B.

Balck:

- Opinion of English extensions of front, 14.
- Opinion of fire losses, 8.
- Opinion of the offensive, 6.

Bandage, abdominal, 61.

Bandolier, cartridge, 104.

Barton, surprise of General, 32.

Batteries in position of observation, 45, 49.

Battle tactics, 188.

Bayonet attack, 122, 137.

Belt, ammunition, 62, 65, 104.

Berchem, Maj. P. Van, on artillery, 21.

Blouse, description of English, 58.

Boer artillery matériel, 25, 140.

Boer election of officers, 29, 30, 139.

Boer tactics:

- Bonnal's description of, 79.
- Denunciation of, 18.
- Description by a German officer, 30, 37.
- Gentz' analysis of, 120.
- Gilbert's description of, 29, 42.
- Stieler's opinion of, 12, 115.

Boguslawski:

- Opinion of the attack, 6.
- Opinion of fire effect, 7, 147, 183, 186.
- Tactical deductions, 127, 163, 202.
- Works on South African war, 15.

Bonnal:

- Eulogy of Captain Gilbert, 50.
- Lessons of the South African war, 70.

Boots of English, 59, 60, 63.

Boshrand, artillery at the battle of, 38.

Breakfontein, artillery at, 33.

C.

Caemmerer:

- On changes in the regulations, 12.
- Opinion of fire effect, 8.

Cap, vizorless, 61.

Canteen, 62, 64, 65.

Carbines carried by officers, 56, 104.

Cartridge pouches and belts, 62, 65, 104.

Cavalry:

- At Elaandslaagte, 142.
- At Koedoesrand Drift, 55.
- Buller's opinion of, 80.
- Duties of, 99, 100, 101, 102.
- Effect of artillery fire on, 48.
- Equipment, 64, 65, 66, 67.
- In the Boer war, 82, 142, 199.
- Visibility of, 55, 92, 105, 110.

Chassepot, range of, 6.

Clark's recoil device for artillery, 23.

Cloak of waterproof cloth, 61, 65.

Clothing, experiences as to, 51.

Colenso:

- Artillery at, 36, 44.
- Battle of, 143.
- Lindenau's analysis of, 7.
- Losses at, 8, 147.

Colors of uniform cloth, 54, 104, 105.

Commanding general's position, 153.

Conclusions:

- As to Boer successes, 120.
- Of anonymous writer, 97.
- Of General Boguslawski, 163, 202.
- Of General Bonnal, 110.
- Of German officer, 41.
- Of Captain Gilbert, 42, 43, 44, 49, 112.

Cooking utensils, 62, 65.

Cooperation of the three arms, 43, 46, 48, 99, 128.

Cover, utilization of, 33, 34, 40, 44, 92, 104, 105, 176.
Cronje, capitulation of, 84.

D.

Dangerous space of artillery, 38.
Decisive range, 6, 10, 44.
Deductions from the Boer war, 110, 163, 202.
Deep formations, necessity for, 49, 50, 123.
De Loffre, Lieut. S. M., translation, 119.
Deployments, 11, 13, 30, 76, 123, 202.
Description:
 Of Boer artillery, 25.
 Of English artillery, 23.
 Of war uniform, 51, 58.
Distinguishing marks of officers, 56.
Döberitz, maneuvers at, 10, 11, 18, 92, 115, 116, 171.
Donkeshock, artillery at, 39.
Drill, its importance, 193.
Duel of artillery, 35, 36, 37, 45.
Dundee, battle of, 141.
Duties of cavalry in war, 82, 99, 100, 101, 102, 142, 199.

E.

Economy of forces in artillery fire, 45, 49.
Effective range, 6, 10, 45, 85, 93, 183, 194.
Effective strength:
 Of Boer army, 26.
 Of British army, 25.
Elandslaagte, 82, 142, 199.
Election of officers by the Boers, 29, 30, 139.
Employment:
 Of Boer artillery, 30.
 Of English artillery, 30, 37, 39.
Engineer troops in the Boer war, 201.
English artillery matériel, 25, 37.
English failures, 6, 157, 163, 197.
English generals, opinion of maneuvers, 10.
English tactical regulations (new), 167.
Entrenching tool, 64, 134.
Enveloping movements of the Boers, 30.
Equipment, experiences as to, 51, 56, 62, 63, 64, 65.
Experiences as to clothing and equipment, 51, 56, 62, 63, 64, 65
Extension of fronts:
 By English, 14, 162, 168, 188.
 By German army, 50, 132, 188, 191, 203.
Extra clothing of soldier, 63, 65.

F.

Failures of English, 6, 157, 163, 197.

Field batteries:

Capture at Colenso, 44.

(See Artillery.)

English, 23, 24.

Field glasses, 65.

Fire:

In motion, 16, 186.

Superiority of, 11, 20, 31, 124.

Visibility of, 33, 36, 104.

Fire, deductions from extra-European wars, 10.

Fire discipline, 194.

Fire effect:

In recent years, 7, 8, 85, 98, 106, 110, 121, 124, 147, 183, 186.

Under Frederick the Great, 77.

Firing line, position of, 20.

Flank attacks, 95, 96, 164.

Flashes, visibility of, 33.

Foot wear, 59, 60, 63.

Fortified positions, value of, 42, 201.

French tactical regulations, 170.

French's opinion on loss of horses, 64, 65.

Fronts, extension of, 14, 132, 162, 168, 188, 191, 203.

Front of units, 11, 14, 111, 168, 189.

Frontal attacks, 7, 9, 10, 41, 88, 89, 95, 98, 111, 121, 163, 202.

G.

Gentz, Lieutenant, tactical study, 119.

General Staff History, 4, 81, 82.

German army, bravery of, 9.

German attack, 172.

German General Staff:

Monograph on fire deductions, 10.

Opinion of, 5, 81.

German infantry, tactics of, 10, 119, 138, 170.

German officer, observations of, 37, 40, 41.

German tactical ideas, 5, 119, 121, 138.

Gilbert's:

Conclusions, 112.

Description of Boer tactics, 29.

Observations on tactics, 42, 44, 47, 49, 50.

Glitter of uniforms, 55.

Group attack, 12, 87, 116.

H.

Haefteenn, essay on clothing and equipment, 51.

Hats of colonials and volunteers, 61, 104.

- Haversack, 62, 63.
- Head gear, 52, 60, 61, 104.
- Helmets, English, 52, 60.
- Herald (New York), article in, 10.
- Highlanders, uniform of, 55.
- Hilyard's criticism of cloak, 61.
- Hohenlohe, opinion of the attack, 18, 112.
- Horse batteries, English, 23, 24, 87.
- Horses:
 - Losses of, 64, 65.
 - Visibility of, 54.
- Horseshoes, 66.
- Howitzers:
 - Boer, 25.
 - English, 23, 24, 25.
- Hurt's opinion of the group attack, 12.

I.

- Imperial maneuvers, 10, 12, 17, 18.
- Importance of drill, 193.
- Indian file, 105, 116.
- Infantry attack, 11, 12, 13, 15, 16, 17, 18, 29, 30, 40, 46, 119, 138, 170.
- Intendance service, 63, 201.
- Intrenching tool, 64, 134.
- Inviolable front, 7, 111.

K.

- Khaki uniform, description of, 53, 58, 61, 104.
- Kimberley campaign, 154, 199, 201.
- Knapsack, 62, 63, 104.
- Knudsen, Capt. F. L., translation, 127.
- Koedoesrand Drift, cavalry at, 55.
- Kreps, Capt. J. F., translation, 51.

L.

- Lack of pursuit by English, 88, 157.
- Lack of reconnoissance by English, 30, 43, 148, 155, 158.
- Lack of unity of action by Boers, 30.
- Langlois:
 - Opinion of artillery fire, 43, 45, 46, 47.
 - Opinion of smokeless powder, 48, 49.
- Lance, 66, 67.
- Lariat, 65.
- Lassiter, Capt. William, translation, 21.
- Leggings of English, 60.
- Lessons of South African war (Bonnal), 73.

Lindenau:

- Analysis of battles, 7.
- Calculation of time of infantry advance, 18.
- Lecture on tactics, 11, 114, 171.
- Praise of, 13.

Lines of masses, 14, 75, 97, 123, 191.

Lines of skirmishers, 15, 76, 95, 105, 113, 123.

Long Tom, mention of, 26, 27, 28, 31.

Long's artillery at Colenso, 44, 146.

Losses:

- At Colenso, 147.
- At Elandslaagte, 142.
- At Magersfontein, 8, 160.
- Cause of English, 82.
- In battle, 8, 20, 151.
- Of horses, 64, 65.

Lyddite shells:

- Description of, 24.
- Effect of, 40, 48.

M.

Magersfontein:

- Battle of, 158.
- Boer use of cover at, 33.
- Lindenau's analysis of, 7.
- Losses at, 8, 160.

Machine guns, description of, 24, 25, 26, 37, 38.

Manner of carrying rifle, mounted, 67.

Maneuvers:

- At Döberitz, 10, 11, 18, 92, 115, 116, 171.
- On Salisbury Plain, 80.
- At Templehof, 10, 18, 91.

Marches:

- As affected by equipment, 62, 63.
- Tests of foot wear on, 59, 60, 63.

Masses, necessity for, 14, 75, 97, 123, 191.

Material for uniforms, 57, 58, 61.

Matériel of artillery in South Africa, 23, 32, 33.

Maxim-Nordenfelt guns, 26, 37, 38.

Melinite shells, effect of, 48.

Metal on uniforms, 55.

Militär Wochenblatt, anonymous article in, 13.

Militia partisans, 119.

Mixture of units, 20.

Mobility of the artillery, 35.

Modder River (Riet), 155.

Mooi River, artillery at the, 31.

Moral element of soldiers, 191.

Mountain guns:

Boer, 25.

English, 23.

Mounted infantry, 66, 79.

N.

Napoleon:

Tactics of, 76, 77, 78, 117.

Use of artillery at Friedland, 36.

Narrow formations, 105.

Navy guns:

Capture at Colenso, 44.

Description of, 24.

Neckel, opinion of, 6.

Nervous exhaustion under fire, 88.

New York Herald, article in, 10.

Night attacks, 122, 132, 134, 150, 161.

Notes on artillery in South African war, 21.

O.

Observation, batteries in position of, 45, 49.

Observations:

Of an eyewitness, 85, 97.

Of a German officer, 37.

Of Captain Gilbert, 42, 43, 44, 47, 49.

Of Capt. Holmes Wilson, 31.

Offensive and defensive, 6, 11, 120, 133, 136.

Officers' side arms, glitter of, 56.

Oral commands in battle, 15.

Orders for mounted troops, 65.

Overcoat of woolen cloth, 61.

P.

Paardeburg, 83, 85.

Pack mules, 64.

Pattern of uniform, 58.

Patterson rifle carrier, 67.

Personnel:

Of Boer army, 139, 162.

Of English army, 138, 163.

Pioneers in the Boer war, 201.

Plevna, lack of unity of action at, 44.

Pompoms:

Description of, 24, 26.

Use of, in battle, 37, 38.

Position of the commanding general, 15.

Pouches, ammunition, 62, 65.

Powder, smokeless, 34, 48, 78, 153, 157.
 Putties, English, 60.

R.

Range, effective, 6, 10, 45, 85, 93, 183, 194.
 Rapid-fire arms, effect on tactics, 11, 78.
 Reconnoissance:
 By artillery fire, 42.
 By English cavalry, 199.
 Lack of, by the English, 30, 43, 148, 155, 158.
 Under modern conditions, 101.
 Reenforcing the firing line, 179.
 Reserve artillery, use of, 35.
 Reserves:
 Position of English, 91.
 Use of, 191, 203.
 Résumé of General Boguslawski, 202.
 Riding trousers, 58, 59.
 Riet, action at, 155.
 Rifle carrier (Patterson), 67.
 Rimington, suggestions on equipment, 65.
 Rôle of cavalry, 200.
 Rouquerol, opinion of use of artillery, 50.
 Rushes, 11, 16, 18, 19, 87, 116, 167, 169, 177, 202.

S.

Saber, 66, 67.
 Saddle, 65.
 Scherff:
 Opinion as to the attack, 12, 114.
 Opinion on field regulations, 10.
 Scots Grays, horses of, 54.
 Screens of artillery, 49.
 Shirt, blue-flannel, 61.
 Sherrill, First Lieut. Clarence O., 5.
 Shields of Boer artillery, 25, 37, 38, 39, 140, 198.
 Shoes of English, 59, 60, 63.
 Shrapnel, effect of, 32, 37, 38, 40, 41, 45, 47.
 Side arms, glitter of, 56.
 Siege guns:
 Boer, 25.
 English, 24.
 Signals, use of, in battle, 15.
 Skirmishers:
 Advance of, 18, 116, 174.
 Lines of, 15, 76, 95, 105, 113, 123.
 Smokeless powder, effect of, 34, 48, 78, 153, 157.

Spade, intrenching, 64.

Spion Kop:

Artillery at, 28, 31, 36.

Battle of, 148.

Lindenau's analysis of, 7.

Night attack, 123.

Spurs, 59.

Stieler's opinion of attack, 12, 115.

Stockings, 60.

Strength of:

Artillery in battles, 26.

Boer army, 26.

English army, 25.

English guns, 24.

Sunstrokes due to removal of helmets, 61.

Superiority of fire, 11, 20, 31, 124.

Supports:

Advance of, 18, 129, 179.

Deployment of, 16, 17, 19, 175.

Fire of, 11.

Hurt's opinion of use of, 12.

T.

Tactics:

Of the Boers, 12, 18, 29, 30, 37, 41, 79, 120, 136, 154.

Of the English, 6, 82, 83, 122, 123, 137.

Of Napoleon, 36, 76, 77, 78, 117.

Talana Hill, action at, 80, 81.

Teachings of the South African war, 21.

Templehof, maneuvers at, 10, 18, 91.

Thebachen, artillery at, 38.

Tiers of fire, 201.

Train:

English, 63, 201.

To follow cavalry, 65.

Transparency of atmosphere in South Africa, 32.

Trousers, description of English, 58, 59.

U.

Underclothing, 61.

Uniform:

At English maneuvers, 70.

Description of English, 51, 58, 61.

Material for, 57, 104, 105.

Unity of action:

Lack of, by Boers, 30.

Need of, 43, 46, 48, 99, 128.

Utilization of cover, 33, 34, 40, 92, 104, 105, 176.

V.

Vaal Krantz, artillery at, 31, 34, 36, 37, 43, 122.

Visibility of:

Cavalry and infantry, 55, 92, 105, 110.

Equipments, 56.

Gun fire, 33, 36, 104.

Helmets, 60.

Uniform clothing, 51, 54.

W.

Waldersee method of attack, 166, 189.

War of 1870:

French tactics, 79.

Front of units, 190.

Losses of, 152.

Opinion of Prince Hohenlohe on the, 18.

Opinions of tacticians after the, 17, 128.

Range of small arms, 6, 86.

Repulse of frontal attacks, 98.

War uniform, description of, 51, 58.

Waterproof cloak, 61.

Weight:

Of cavalry equipment, 64, 65.

Of infantry soldiers' equipment, 62, 64.

Relieving soldier of, 104.

Wilson, Capt. Holmes, 31,

Wire cutters, 65.

Woolen overcoat, 61.

O





Sketch Map of the Battle of Colenso.

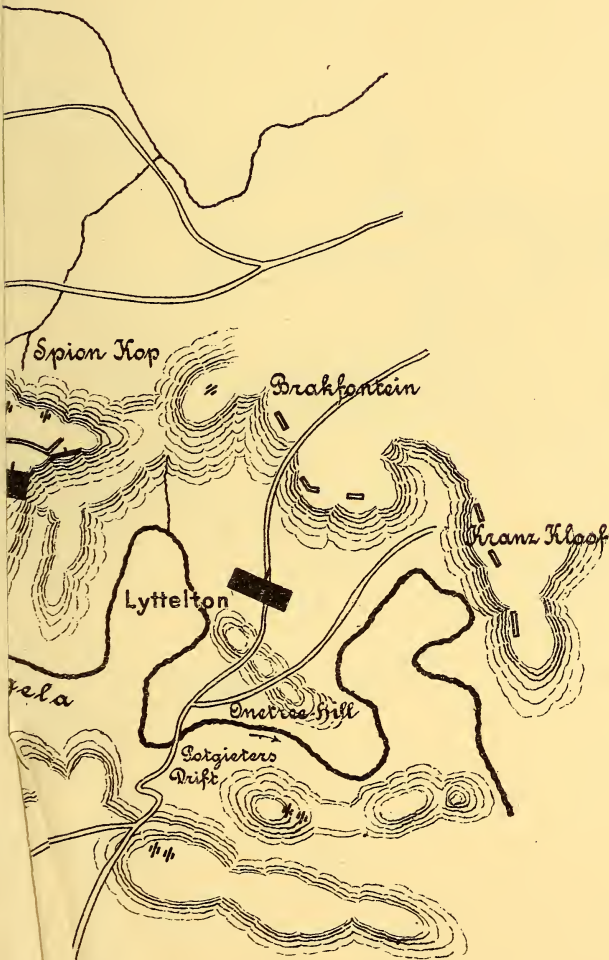
December 15, 1899.

Plate 1.

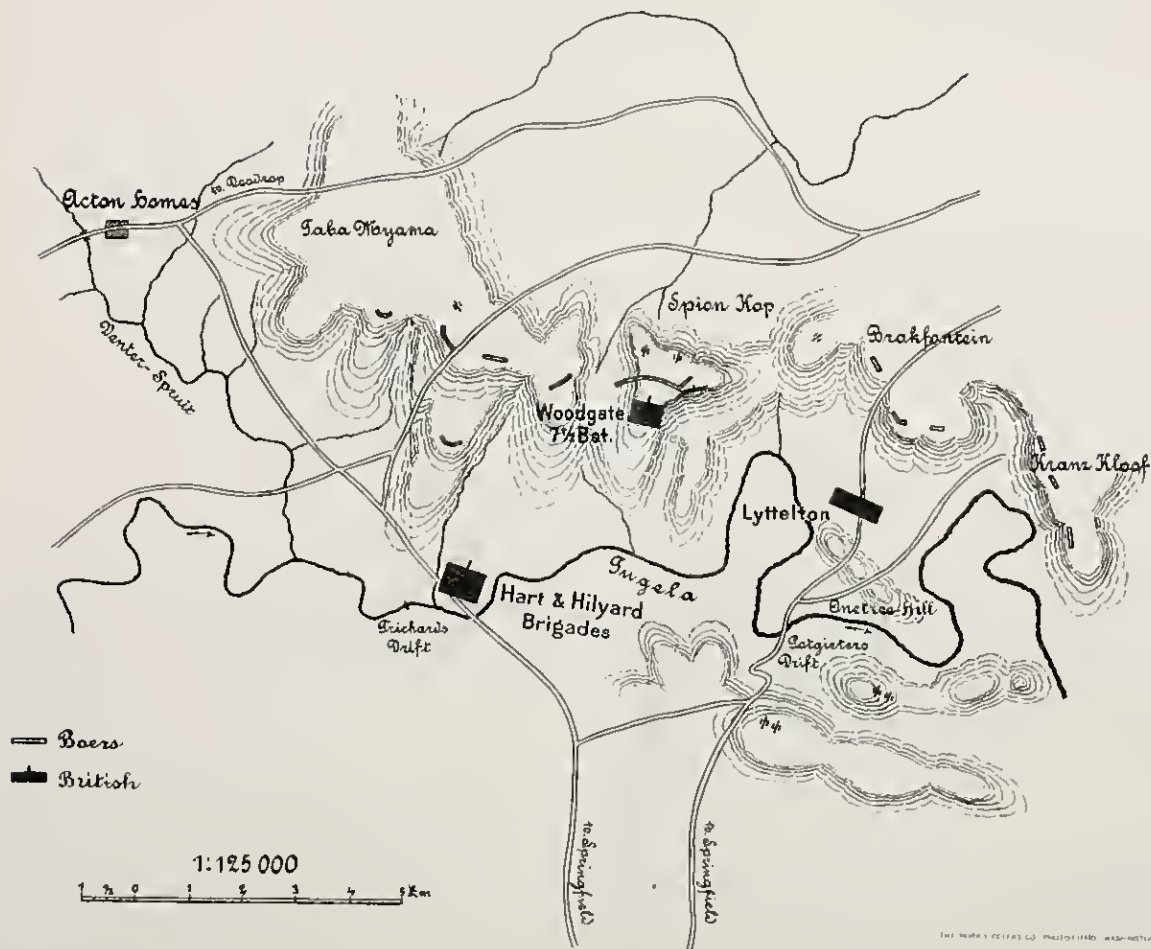




at Spionkop
DO.



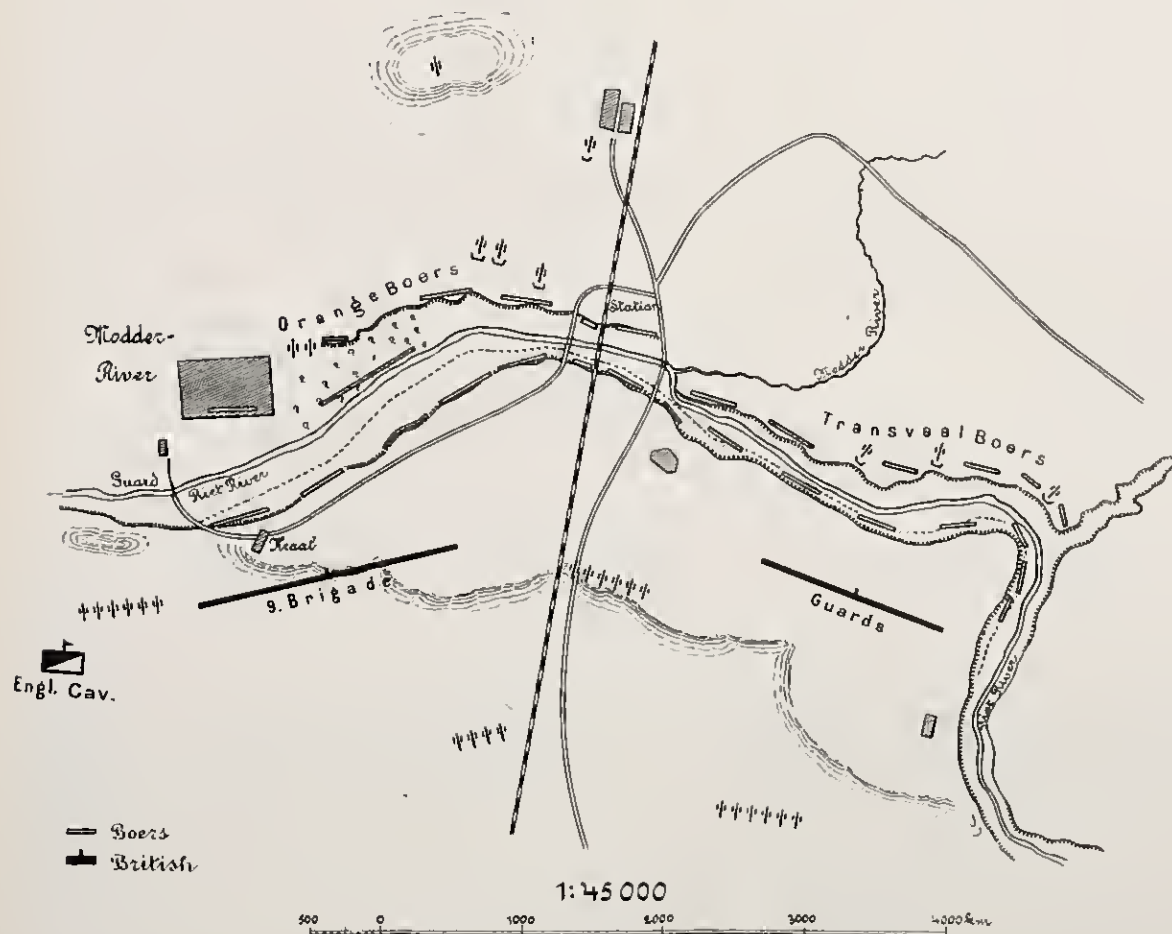
Sketch Map of the Action at Spionkop January 23/24, 1900.



er River Village on Riet River
, 1899.



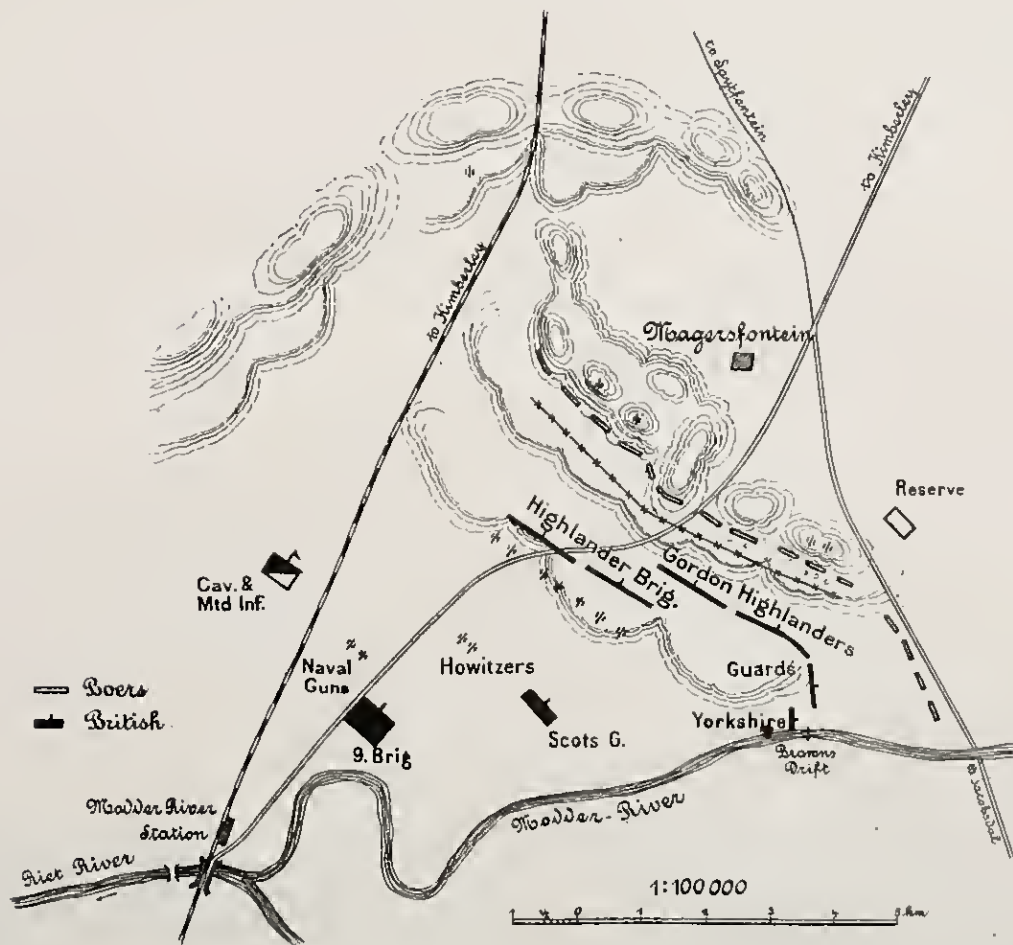
Sketch Map of the Action near Modder River Village, on Riet River November 28, 1899.



e near Magersfontein.
899.



Sketch Map of the Battle near Magersfontein. December 11, 1899.





WAR DEPARTMENT . . OFFICE OF THE CHIEF OF STAFF
SECOND (MILITARY INFORMATION) DIVISION
GENERAL STAFF

No. 10

Drill Regulations for The Infantry, German Army 1906

Translated for the General Staff, U. S. Army
By First Lieut. FRANCIS J. BEHR
Coast Artillery Corps

JUNE 30, 1907



WASHINGTON
GOVERNMENT PRINTING OFFICE
1907

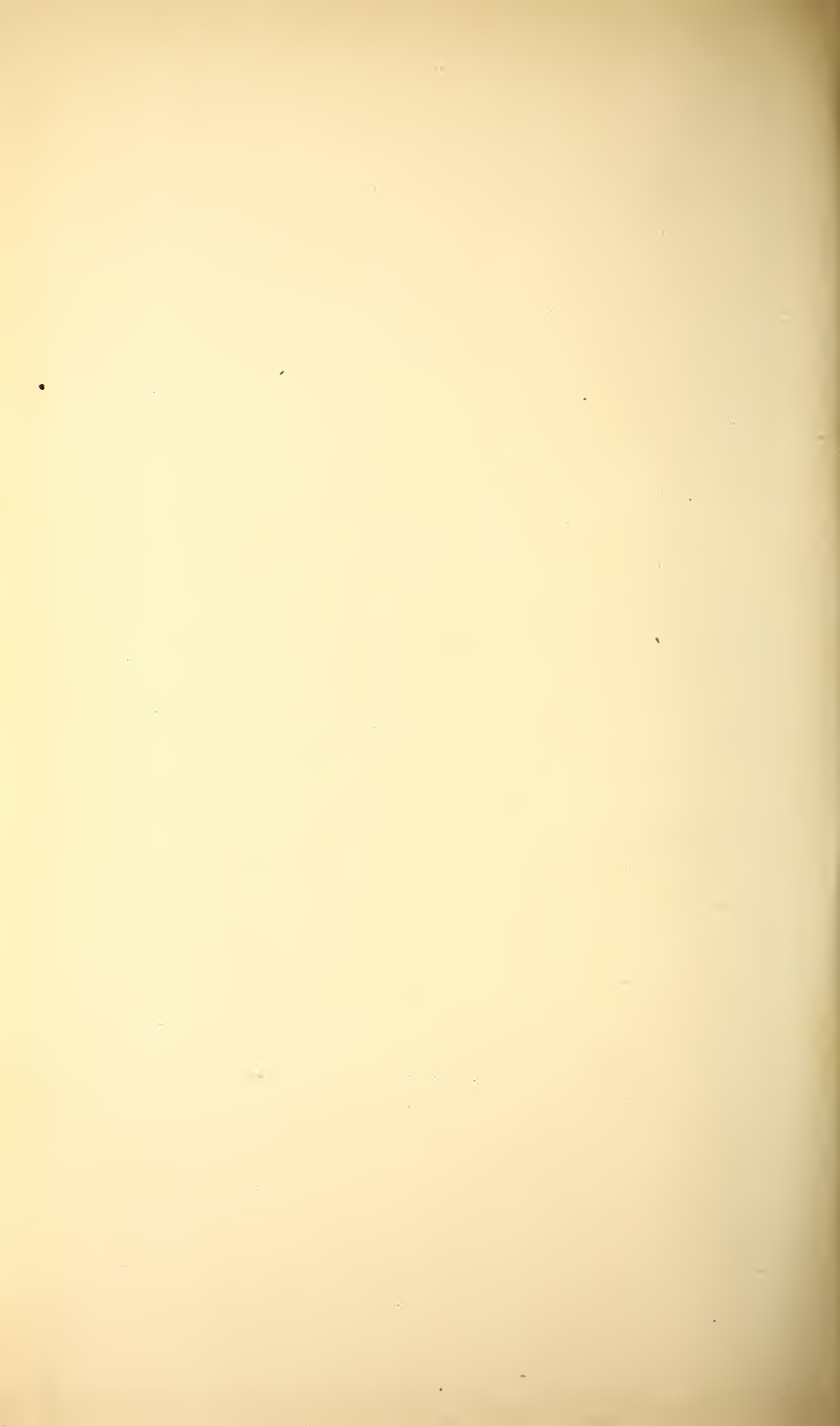
WAR DEPARTMENT
Document No. 239
OFFICE OF THE CHIEF OF STAFF

PREFACE.

"Drill Regulations for The Infantry, German Army, May 29, 1907," translated from the German by Lieut. Francis J. Behr, Artillery Corps, U. S. Army, is published by consent of the German Government. The high state of efficiency of the infantry of the German army is recognized and the information contained in its regulations should prove of value to officers of the Army and National Guard, to whom copies of the translation will be distributed.

WILLIAM P. DUVAL,
Brigadier-General, Acting Chief of Staff.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
Washington, May 18, 1907.



INFANTRY DRILL REGULATIONS

MAY 29, 1906.

[Berlin, 1906. Ernst Siegfried Mittler & Son, Publishers to His Majesty, Kochstrasse 68-71.]

I approve the following drill regulations for the infantry in the expectation that, while fully maintaining our old traditions of order and discipline, war training for which the new regulations afford further scope will be constantly promoted.

It is prohibited to make any additions to the regulations, oral or written, for the attainment of greater regularity or other purposes. The scope permitted in the application of the regulations and in training must not suffer any limitation.

I empower the war department, however, to make necessary changes in so far as they are not of a fundamental nature.

DÖBERITZ, *May 29, 1906.*

WILLIAM.

To the WAR DEPARTMENT.

TABLE OF CONTENTS.

	Page.
Introduction	9
PART I.—THE SCHOOL.	
1. The company:	
(A) Close order—	
(a) School of the Soldier—	
In general.....	13
Instruction without arms—	
Position.....	13
Marching	14
Double time	15
Facings and marching by the flank.....	16
Instruction with arms—	
Position.....	17
Manual of arms.....	18
Fixing and unfixing bayonets.....	20
Loading, firing, unloading.....	21
Marching and double-time with arms	25
Attack.....	25
Manual of the color.....	26
Manual of the sword.....	27
(b) Company—	
In general	28
Formation	28
Alignment, touch of elbows, covering	32
Facings and manual	36
Loading and firing	36
To stack and take arms.....	37
Marching	38
Turnings	42
The charge.....	44
(B) Extended order—	
In general.....	44
(a) Individual training as marksman.....	45
(b) File and squad.....	47
(c) Platoon—	
The platoon commander	48
Formation of a skirmish line.....	50
Movements and taking position of a skirmish line.....	51
Kinds of fire and commands.....	53
Effect of fire	54

1. The company—Continued.	Page.
(B) Extended order—Continued.	
(c) Platoon—Continued.	
Fire direction and control	55
Closing up; assembling; forming	57
(d) Company—	
The company commander	58
The skirmish line	58
The support	59
Closing up; assembling; forming	61
2. The battalion	61
3. The regiment and the brigade	64

PART II.—THE COMBAT.

Introduction	65
Leadership	68
Utilization of ground	74
Use of field works	75
Advance into action	75
Conduct of the attack	77
Rencounter	81
Attack on an enemy deployed for defense	82
Attack of a fortified field position	84
The flank attack	87
The defense	88
Delaying action	91
Pursuit	92
Retreat; cessation of the combat	93
Village and forest fighting	94
Action in combination with the other arms	96
Units in action	98
Concluding remarks	101

PART III.—PARADE; ESCORT OF THE COLOR; SALUTES.

(1) Parade:	
In general	102
Parade formation	104
The march past	106
Instructions for parades in the presence of His Majesty	109
(2) Escort of the Color	110
(3) Salutes	112

APPENDIX.

Musicians and band:	
Manner in which instruments are carried by the musicians	115
Manipulation of the baton	116
Formation and duties of musicians and band	117
Supplement I: Calls	122
Supplement II: Marches for fife and drum	127
Supplement III: Other pieces for fife and drum	140

INTRODUCTION.

1. The regulations furnish rules for instruction and consider matters relating to the infantry combat. Since, however, this principal arm almost always fights in combination with the other arms, their conduct is taken into account in so far as it is important for the infantry combat.

2. War demands stern discipline and the exertion of every effort. Especially does the combat require leaders trained to reflection and to self-reliance, and soldiers of initiative, who, from devotion to their Emperor and the Fatherland, manifest a firm purpose to conquer even when their leaders have fallen.

3. In war only simple methods can secure results. It is important, therefore, to learn and apply simple formations, which must be practiced until complete facility is attained. All unpractical work is prohibited. Parade exercises are added, which, on account of their great value for purposes of discipline, must be executed with the utmost exactitude.

4. Each commander of troops, from the company commander upward, is responsible for the development, according to regulations, of those placed under his charge, and is to be allowed freedom in the choice of the means. Superiors should interfere as soon as they notice errors and lack of progress.

5. The school drills end with the company. In exercises involving the battalion and higher units, cooperation of the individual units for the common battle purpose must be acquired.

6. Continued drill of the same kind tires both body and mind. In the exercises, therefore, variations are introduced. Their duration and kind must also be gradually adapted to the powers of the men, since otherwise the unavoidable relaxation on account of overexertion is detrimental to military discipline.

7. The more often the ground used is changed in exercises, the greater is the gain for the troops. For this reason every opportunity and every season of the year must be taken advantage of.

8. Exercises by units at war strength are of particular value. Even within the company they are useful, serving to develop platoon leaders and numerous squad leaders, one or two platoons being at war strength, the rest skeletonized—merely the full number of platoon and squad leaders being retained. From the battalion upward, especially in large units, exercises are recommended as occasion offers, in which the marching depth [marschtiefe, distance between units on a march] of troops at war strength can be attained by increasing the distance between companies.

9. In peace maneuvers, unless exceptional losses are ordered, more men are added to the firing line through reenforcement than can find room for the free use of the rifle. The men in excess follow immediately behind the firing line. They do not fire, but conform to each movement of the firing line.

10. The commands (printed in heavy type) are divided generally into preparatory commands and commands of execution. The former are somewhat prolonged, the latter short. The pauses are indicated in the text by means of leaders (.). Indifferently given commands lead to careless execution. The commands are to be given in a sharp tone, but not louder than the purpose requires.

11. In addition to commands and orders, calls and signals are used.

The whistle may be used to fix the attention before an order is given.

To **advance** the leader raises the arm.

To **indicate the direction**, the leader designates with the raised arm the direction of march.

To **halt**, the raised arm is lowered.

To **deploy**, both arms extended are raised laterally to the height of the shoulders; when necessary one of the arms is then pointed in the direction the skirmishers are to move.

To **assemble**, a circle is described above the head with the arm.

These signals may also be given with the weapon. Additional signals require mutual understanding in each individual case.

If a signal is given to a unit in close order, it is repeated by its leader.

12. At great distances time and energy are economized in the transmission of orders and reports by means of signal flags. In the zone of effective fire regular signaling is but seldom possible. During a battle rapid communication may be had by signals made by wigwagging (arms, hats, etc.). The following signals, which can all be given in a lying position, are commonly to be used:

a a a—"Advance."

g g g—Given from the advanced firing line to the rear:
"Advance our own artillery fire."

h h h—"Halt."

m m m—Given from the advanced firing line to the rear:
"Ammunition needed." Given from the rear to the front: "Ammunition coming."

s s s—Given from the advanced firing line to the rear:
"We wish to begin the attack." Given from rear to the front: "The attack is about to begin."

If the signal is understood, V (verstanden=understood) is sent back.

Further signals require mutual agreement in each individual case.

Part I.—THE SCHOOL.

1. THE COMPANY.

A. CLOSE ORDER.

a. SCHOOL OF THE SOLDIER.

In general.

13. Careful, rigid, individual training is the basis of all military education.

It is only by the thorough training of the individual that the necessary cooperation of the many can be attained.

Erroneous or incomplete training of the recruit impairs his effectiveness during his whole time of service. Errors which creep in during the first instruction can seldom be eradicated because of their detrimental consequences. Likewise it is impossible to compensate for lack of individual training by means of combined exercises.

14. In fencing exercises one should seek suppleness, address, and a good position rather than quickness and exactness.

Instruction without arms.

POSITION.

15. **Attention.** The man observes silence. He stands in place, with his heels as near each other as his conformation permits. The toes are turned out equally, the feet forming nearly a right angle. The weight of the body rests equally on the heels and balls of the feet.

The knees are straight without stiffness.

The upper part of the body is upright, the chest thrown out moderately; the shoulders are at the same height and slightly thrown back, but not raised.

The arms hang without constraint; the elbows are slightly bent and carried somewhat forward.

The hands touch the thigh with the palms and points of the fingers. The fingers are joined and bent naturally, the little finger touching the seam of the trousers.

The neck is held free and without restraint.

The head is erect, the chin slightly drawn in, and the eyes directed straight to the front.

16. Should a preparatory command be given without **ATTENTION** having preceded it, the man will observe silence of his own accord.

17. **At ease.** The left foot is advanced. The man is permitted to move, but is not allowed to speak without permission.

MARCHING.

18. The march is divided into the drill march, the march in cadence (march at attention), and the march without cadence (route step).

19. The drill march furthers discipline and control of the troops. It is used at regular closed formations, when rendering honors and at parades.

Detachment.....MARCH.^a The left leg is slightly bent, the toes depressed and pointing slightly outward, and the lower part of the leg so extended as to form a straight line with the thigh. At the same time the weight of the body is thrown forward. The foot is planted lightly and flat on the ground at a distance of about 80 centimeters from the right foot. The whole weight of the body now rests on the left foot.

While the left foot is being planted the right heel leaves the ground. The right leg is advanced, the knee slightly bent, the toes being near the ground but not touching it. The leg is straightened. The foot is then planted in the same manner as the left.

In this manner the man continues the march. He moves straight forward in a line perpendicular to his shoulders. The

^a (Abteilung) This preparatory command is used for each detachment below that of a company, and for individuals.

If only a part of a larger unit is to execute a movement, it is to be designated particularly, e. g., **Second Platoon.....March.** (For the company, battalion, etc., the preparatory command is **Company ———, Battalion ———, etc.)**

arms swing without constraint. The cadence of the march is 114 steps per minute.

20. For parade purposes: **Mark time, Detachment**
March (during the march: **Mark time**). The man alternately raises and plants each foot on line with the other, without raising the knee or lower leg too high or stamping on the ground. The cadence is maintained. **Forward**
March. The command of execution is given as the left foot touches the ground. The man takes another step with the right foot in position and then steps off with the left foot to the usual distance.

21. To change from the drill march to the march in cadence, the command **At ease** is given.

The rigidity of the drill march, viz, the pressing back of the knees, is relaxed, but good carriage, length of pace, and cadence are still maintained.

At **Attention**, the drill march is resumed.

22. **Route step**
March (if at the drill march or march in cadence, **Route step**). The character of the ground and the build of the individual determine the length of the step and the cadence. The march must not be retarded, and good carriage is to be preserved. To change from route step to the march in cadence, the command **Take step** is given, and to the drill march, **Take step**
Attention is given.

23. **Detachment**
Halt. Marching in step the command of execution is given as the right foot touches the ground. The march is completed with the left foot and the right brought by the side of the left. During the route step at the command **Halt** the man takes another step and brings the rear foot by the side of the other.

DOUBLE TIME.

24. **Double time**
March, March. At **Double time** the forearms are raised, so that when resting lightly against the body they form nearly a right angle with the upper arms which hang naturally. The hands are lightly closed, thumbs uppermost and nails toward the body.

At the second **March** the double time is taken up naturally, beginning with the left foot. The feet are placed flat on the

ground, the knees being slightly bent. The arms are moved slightly backward and forward near the body. The length of the step is from 75 to 90 centimeters, according to the nature of the ground; the cadence is 170 to 180 steps per minute.

If marching at route step the command **Take step** (attention) is to be given immediately before the command **Double time**.

At **Detachment**.....**Halt**, the man comes to the halt after the third step.

At **Quick time**.....**March**, the march in cadence is resumed after the third step.

25. March, March. The man runs as fast as he can, at the same time retaining his alignment.

The change to a halt or quick time takes place without further command as soon as the designated position is reached, or at **Squad**.....**Halt**, or **Quick time**.....**March**. In the last case the route step is to be taken up.

FACINGS AND MARCHING BY THE FLANK.

BEING AT A HALT.

26. Right (left).....Face. Pressure is exerted on the ball of the right foot while the right heel is somewhat raised, and the body is turned about 90 degrees to the right. The left heel, upon which the weight of the body rests, turns in position, the left toe being somewhat raised. The right foot leaves the ground and after the facing is completed is placed smartly by the side of the left. Hips and shoulders take the new direction at the same time as the feet.

27. Detachment.....About face. The facing is executed by a turn of 180 degrees to the left on the heel of the left and ball of the right foot. When the turning is completed the right foot is placed smartly by the side of the left.

BEING IN MARCH.

28. By the right (left) flank.....March or Right oblique (left oblique).....March. The command of execution is given as the right (left) foot strikes the ground. The man executes the turning on the ball of the left (right) foot toward the designated side with the following step and continues the march in the new direction.

29. Detachment to the rear March. Marching in step the command of execution is given as the right foot strikes the ground.

The turning about to the left is executed on the ball of the left foot and the right foot is placed by the side of the left.

Instruction with arms.

POSITION.

30. Position at "the order." The piece is vertical, the sling to the front, the butt close to the right foot, the heel of the butt being on line with the toes. The right arm is extended and both elbows are at the same height. The right hand grasps the piece, thumb in rear of the barrel or hand guard (depending on the size of the man), the other fingers being bent naturally but joined, index and middle fingers resting upon the gun sling.

31. Kneel. The man places the left foot about a pace in front of the right, at the same time turning on the ball of the right foot and kneels on the right knee. The piece is carried vertically forward to the right of the right knee and held with the right hand at the hand guard. The left hand is placed on the left knee.

Rise. The man quickly rises, pressing the left hand against the knee in so doing, and places the right foot beside the left. The piece is replaced near the right toe.

32. Lie down. The man first kneels, at the same time grasping the piece with the left hand at the balance, muzzle somewhat elevated, and inclines the upper part of the body forward. He then extends his right hand flat toward the front and lies forward flat upon the ground, the left knee being somewhat drawn in. To accomplish this first the left knee, then the right hand, and finally the left elbow are used as points of support for the body. All motions follow each other rapidly.

The piece is placed on the left forearm, where it rests between the upper and lower rings, barrel to the left, the right hand grasping the hand guard.

Rise. The man places the piece in the left hand, muzzle somewhat raised, supports himself on the right hand, and at

the same time draws the right leg as near to his body as possible without raising thereby the upper part of the body from the ground. He then raises himself quickly by means of the right hand, places the left foot forward and brings the right by the side of the left. At the same time the right hand grasps the piece and replaces it near the right toe.

33. If the man is in the front rank he must take a long step forward before lying down, and if in the rear rank, a like step after rising.

34. After taking the position *kneeling* and *lying down*, the man is permitted to move only at command.

MANUAL OF ARMS.

35. In the manual of arms the arms and hands only are allowed to move, the rest of the body remains in an erect and fixed position. Handling the piece so as to make the execution of the manual audible and striking the butt on the ground are prohibited.

The individual motions of which each movement in the manual consist are executed in a quick and precise, yet easy manner, one following the other without undue haste. The piece is never grasped by both hands simultaneously; on the contrary, the movements of the hands are consecutive.

36. **Shoulder Arms.** The right hand raises the piece and brings it vertically, barrel to the right, in front of the center of the body, lower band at the height of the collar. The left hand grasps the piece immediately below the right. The right hand grasps the magazine about two finger breadths above the bolt handle. The thumb lies extended along the stock.

While the right hand raises the piece, barrel turned to the front, as far as necessary to bring it to the left shoulder, the left hand grasps the butt in such a manner that the heel lies between the thumb and index finger, and the palm as well as the ends of the fingers are pressed against the flat part of the butt. The piece lies parallel with the row of buttons, the ball of the bolt about the height of the second button of the blouse, the butt immediately in front of the left cartridge box. The left forearm rests lightly against the cartridge box. The right arm resumes its position at the side.

37. Order Arms. The left hand carries the butt toward the left thigh, turning it slightly toward the body, the right hand grasps the piece at the height of the shoulders, the elbow pressed slightly downward.

The right hand carries the piece in a vertical position across the body, turns it slightly outward, and permits the piece to slide through the hand if the height of the man requires it. The thumb lies behind the barrel or hand guard. The left arm resumes its position at the side. The butt is placed near the right toe.

38. Present Arms. The left hand carries the piece in front of the left half of the body, turning it slightly to the right, so that the man can still, with the left eye, look straight ahead on the right side of the piece. The right hand grasps the small of the stock at the same time, the thumb toward the body. The left hand grasps the piece so that the end of the thumb, which lies extended along the rear sight, coincides with the front end of the sight, and together with the right hand turns the barrel toward the body; the fingers of the right hand are placed extended immediately below the guard on the small of the stock, thumb below the lock. The piece is thus lowered so that the lower band is at the height of the collar, the stock touching the right forward edge of the left cartridge box. The left forearm forms almost a right angle with the upper arm.

39. For rendering honors the command, **Attention, Present Arms** is given. The inspecting officer must be looked at; when necessary, the command **Eyes Right** (eyes left) must be added. The man follows the inspecting officer with his eyes, turning his head for the purpose, until the inspector is opposite the third man from him, when he turns his head straight to the front.

40. Shoulder Arms. The left hand turns the piece so the barrel is toward the right, the right hand grasps the magazine about two finger breadths above the ball of the bolt in such a manner that the thumb lies extended along the stock, and raises the piece as far as necessary to bring it to the left shoulder. Further procedure according to paragraph 36.

41. Grounding the piece. Sentries standing at the order with bayonets fixed salute by "grounding the piece" instead of by the "present."

The right hand grasps the handle of the bayonet and muzzle of the piece beneath the front sight, so that the ring and little fingers lie beneath the knob of the bayonet handle. The piece is raised slightly, carried to the right to the full extent of the right arm, and then lowered vertically. After rendering the honor, the man resumes his position at "the order" in the inverse order.

FIXING AND UNFIXING BAYONETS.

42. The fixing of the bayonet can be executed from all positions of the piece and during movements; it is executed while "at ease" only on command or signal. After the fixing of the bayonet, the piece is returned to its former position.

In order to save wear on the piece, the fixing of the bayonet is omitted while drilling. It suffices to instruct the man individually. But on each occasion when the fixing of the bayonet would actually take place it must be ordered either by command or signal, and the soldier must go through the motions.

43. Fix.....Bayonet. If the man is standing at "the order" or is kneeling, he draws the bayonet with the left hand, back toward the body, from the scabbard, and fixes it in its support, during which the muzzle of the piece is inclined about two hand breadths to the front. The bayonet is pressed down until the click is heard as the catch enters its recess, and the spring is fully seated.

To execute fix bayonet while marching at "shoulder arms," the piece is carried as at "to the charge right," paragraph 65.

When lying down the bayonet is fixed in the manner most convenient to the individual.

44. Unfix.....Bayonet. The execution takes place "at ease" and usually at "the order." The right hand grasps the piece at the height of the upper band, inclines it about two handbreadths toward the front, and presses back the catch with the thumb. The left hand raises the bayonet and places it in the scabbard, the man looking toward it while so doing.

LOADING, FIRING, UNLOADING.

45. Loading must be frequently and thoroughly practiced in order that each man may be able to load quickly and safely in all positions of the body. When drilling at loading, the piece must be used carefully. Opening and closing the chamber, as well as locking the piece are executed only when using cartridges.

Before beginning loading the cartridge box is opened on command, and closed without additional orders at the end of the exercise.

LOADING.

46. If firing is to take place immediately after loading, the command **For Firing** **Load**, will be given.

The man standing at "the order," at the command **Load** makes a half face to the right by turning on the ball of the left foot and places the right foot half a pace to the right. The hips and shoulders turn at the same time as the feet. The knees are slightly bent, the weight of the body resting equally on the balls and heels of both feet.

While turning, the right hand brings the piece to the front, muzzle at the height of the eye. The butt rests lightly on the right cartridge box and even with its rear edge. The left hand grasps the piece near the balance, the left thumb extending along the stock. The man inclines his head toward the breech, thumb and index finger grasping the bolt handle, so that the second joint of the thumb lies over the handle.

The right hand turns the bolt to the left and with one motion draws it to the rear. The right hand then passes underneath the piece to the cartridge box and with the thumb and index finger brings out a loaded clip. The clip is inclined somewhat toward the rear as it is inserted in the magazine opening. The thumb presses along the clip on the upper cartridge until it is completely beneath the right wall of the magazine.

The right hand again grasps the bolt handle as on opening, thrusts the bolt home, and turns the handle to the right in one motion. The right hand then grasps the small of the stock so that the index finger is within the guard and in front of the trigger. The head is raised and directed straight to the front.

The right arm rests lightly against the outer side of the butt. At the command **Firing**, the rear-rank man steps promptly one pace to the right and front toward the front rank.

47. The man standing at the "shoulder arms" at the command **For Firing** brings the piece down as "to the charge-right" (trail arms) (65), the man in the rear rank does so while moving over. Further procedure at **Load** according to paragraph 46.

48. When kneeling the man in the front rank at the command **For Firing** rests the weight of the body on the right heel, the man in the rear rank moves straight up one-half pace toward his front-rank file. Further procedure at **Load** according to paragraph 46.

FIRING.

49. At Cavalry straight ahead: At 900 [meters]: Aim-----
Fire: Load.

The instruction of the soldier in musketry, e. g., manipulation of the sight, position and aiming, delivery of fire, etc., is laid down in the Firing Regulations (Schiess Vooschrift). At "at 900 meters," the man inclines his head toward the sight. The left hand, while carrying the piece back and somewhat toward the face, sets the sight at the designated mark with the thumb and middle finger and then brings the piece back to its former position, the man at the same time raising his head.

The pause between **Aim** and **Fire** is longer when aiming in the kneeling position and at long ranges than while aiming in the standing position and at short ranges. The command **Fire** is somewhat prolonged.

Load. The piece is brought from the aiming position to that designated in paragraph 46. When cartridges are still in the magazine the man loads by drawing back the bolt and pushing it home again; when the magazine is empty, loading is executed according to paragraph 46.

50. At Cavalry left oblique: At 700 [meters]: Fire at will:
Cease firing: Load.

At **At Cavalry left oblique**, the man faces in the direction of the designated object, the rear rank man at the same time moving forward a little to the opposite side. At **Fire at will**

the man fires and loads of his own accord, according to paragraph 193.

Cease firing. Firing is immediately suspended, every movement of loading ceases, and any man in the aiming position brings his piece down.

Load. Each motion of loading which was interrupted by the command **Cease firing** is completed, and the man holds himself ready for firing.

51. While in the kneeling position the front rank man fires with a support (elbow resting on knee and weight of body on heel), the rear rank man offhand (without support).

RECOVER ARMS; LOCKING THE PIECE; COMING TO THE ORDER.

52. If the man in the position of aim is to take the position of load, the command **Recover Arms** is given.

At **Recover** the left eye is opened and the index finger straightened. At **Arms** the head resumes the erect position and the piece is brought to the position as prescribed in paragraph 46.

53. Lock Pieces. At the command **Lock** the man inclines the head toward the breech. At ranges of 500 meters and upward the slide of the sight is run down with the thumb and middle finger of the left hand. The right hand is carried to the safety lock, grasping it below with the first joint of the thumb and above with the middle joint of the index finger.

At **Piece** the safety lock is turned to the right, and the erect position of the head resumed.

54. Order Arms. While the man resumes his position by one movement on the left heel, the left hand brings the piece toward the right shoulder. The right hand grasps the piece above the left and places it near the toe of the right foot. The left hand is carried to the side.

The man in the rear rank at the command **Order Arms** first takes position while coming to the order and then steps back to his former position.

55. When kneeling the man at the command **Order Arms** places his piece on the ground according to paragraph 31. At the same time the front rank man rises from his right heel to the upright position while the rear rank man steps back only after he has risen.

LOADING AND LOCKING THE PIECE.

56. If firing is not to be executed immediately after loading, the piece is loaded at will. At **Load and lock** the man, whether standing or kneeling, carries the piece obliquely in front of the breast, muzzle high to the left, and loads and locks the piece as is most convenient to him. The man in the rear rank does not move up or over.

After the piece is locked, it is brought to its former position. Loading and locking the piece are similarly executed while in motion.

57. Loading and locking of the piece while lying down are executed in the extended order only. The man lies somewhat on the left side, supports himself with the left elbow, and brings the piece forward. The right hand passes between the body and the piece to the cartridge box. After loading and locking the piece it is again laid on the left forearm, barrel to the left, as in paragraph 32.

BRINGING THE LOADED AND LOCKED PIECE TO THE READY.

58. For firing ----- **Ready**. At **Firing** the last parts of paragraphs 46, 47, and 48 are executed. At **Ready** the man brings the piece forward according to paragraph 46, grasps the safety lock with the thumb and index finger of the right hand and turns it to the left. Then the right hand is carried to the small of the stock, index finger in the trigger guard.

UNLOAD.

59. **Unload**. The execution takes place at will. The piece is brought into the position prescribed in paragraph 56. The man inclines the head toward the opening of the magazine. The left hand is slid back until the thumb lies on the left and the fingers on the right of the opening of the magazine. The unlocked bolt is slowly drawn back, the man taking the cartridge that was in the chamber from the magazine with the right hand. The cartridges in the magazine are unloaded in the same manner, the bolt being pushed completely forward and back each time.

After unloading, the trigger is pulled, the piece locked with the left hand and brought to its former position.

MARCHING AND DOUBLE TIME WITH ARMS.

60. While marching at "shoulder arms," as well as when rendering honors and at the "march past," the left elbow remains fixed, the right arm moves without constraint.

To rest the men while marching in step the command **Right shoulder arms** may be given.

61. **Double time** **March, March**. At the command **Double time** the piece is placed on the right shoulder. The right hand grasps the small of the stock, the wrist resting lightly against the cartridge box. The left hand holds the bayonet and intrenching tools, the point of the bayonet pointing downward toward the front. The arms must not be permitted to make a noise. At **Detachment** **Halt** or **Quick time** the former position of the piece is resumed.

62. Should the command **March, March** be given while at **Double time**, units in close order, carry the arm as prescribed for the march or for the assault; otherwise the piece is carried at will.

63. To halt and immediately kneel or lie down, the command **Kneel** or **Lie down** is given. The execution takes place according to paragraphs 31 and 32.

64. To accelerate the advance from the kneeling (lying) position the commands **Detachment (route step)** **March** or **Double time** **March, March** may be given. In the first case the man gets up at the preparatory command and takes the "shoulder arms." In the second case he gets up at **Double time** and brings the piece to the right shoulder while rising.

If the command **March, March** is given when kneeling or lying down, each man carries the piece as is most convenient to him for running.

ATTACK.

65. **To the charge, piece** **Right (trail arms)**. The left hand carries the butt, turning it inward, toward the left thigh. The right hand grasps the piece at the height of the shoulder, brings it to the right side, but slightly above the ground. The muzzle is about two hand breadths in front of the right shoulder. The left hand holds the bayonet scabbard. The man marches at attention, the cadence being in-

creased to 120 steps per minute. The command **March, March** follows soon after the increase of cadence.

66. Charge Bayonet. The command is executed by the men of the front rank only. Each man brings the piece forward with the right hand so that the small of the stock lies immediately in front of the right cartridge box, and the muzzle in front of the left shoulder and at the height of the eyes. The left hand grasps the piece at the hand guard and the right at the small of the stock.

67. If the command **Detachment Halt** is given after "trail arms" or "charge bayonets" is executed, the "ready" is resumed.

MANUAL OF THE COLOR.

68. If the manual consists of several motions, they follow one another without undue haste. At the "order arms" the color stands by the side of the right foot, the heel of the pike being on line with the toe.

69. When coming to the "shoulder arms," the color is brought to the right shoulder with the right hand.

In all movements at the route step and on marches the color may be carried on the right or left shoulder, at the will of the color bearer.

When the color is unfurled, it must be carried so that the edge remains at least one-half a hand distant from the shoulder of the color bearer.

70. The color is carried at the "carry" at the march past in regimental columns (regiment in column of companies), at the receiving of the colors until the departure of the color company, and also at the removal of the color from the time "to the color" is sounded, on ceremonial occasions at which the colors are brought to the front.

The pike rests in the socket of the sling, vertically against the right shoulder, the right hand grasping the heel, the left hand grasping the pike at the height of the shoulders.

71. In coming to the "order arms" the color is brought, with the right hand, to the position designated in paragraph 68.

72. When rendering honors, the color is brought to the carry according to paragraph 70, except that it does not rest in the socket of the sling.

The right hand grasps the heel of the pike, both hands bringing the color in front of the center of the body.

The top of the pike is lowered to the front until the cloth almost touches the ground.

The color is again raised and brought against the right shoulder. It is left in this position until the troops resume the "shoulder arms." The right hand then grasps the pike immediately below the left and places the color on the right shoulder.

The left hand is carried to the left side.

MANUAL OF THE SWORD.

73. Officers and noncommissioned officers equipped with officers' side arms usually draw the sword when drilling with detachments under arms if such detachments are as large as platoons, are in close order, and also in all cases when marching at attention through inhabited places.

In battle the sword must, at the latest, be drawn when the troops advance to the charge.

74. At "order arms" the sword, without being turned, is lowered so that the point touches the ground.

The grip is embraced with the whole hand.

At "shoulder arms" the hilt lies against the thigh, the back of the blade at the right shoulder (seam of the sleeve). The thumb is passed through the bow (of the hilt); the sword rests in the palm of the hand, the pommel between the second and third fingers. While marching the right arm moves naturally, the left hand holding the scabbard vertically.

75. Before executing the salute the sword is grasped so that the index and middle fingers lie in front of the hilt, the thumb alongside it, and the rest of the fingers behind the pommel.

In executing the salute, the sword is brought vertically in front of the middle of the breast, but turned flat toward the body, the pommel being at the height of the fifth button on the blouse. The blade is lowered flat to the ground, so that the right arm extended drops alongside the right thigh. The point of the sword remains at a distance of a hand breadth from the ground.

The first movement of the salute is executed quickly at the "present," the next slowly.

The sword is kept lowered until the "shoulder arms" is resumed. Simultaneously with this motion the sword is brought in front of the breast, and with a second movement to the right side.

76. Officers mounted place the hilt of the sword on the right thigh two hand breadths from the hip joint so that the wrist and the third and fourth fingers, which lie closed behind the hilt, rest on the middle of the thigh. The back of the blade rests against the shoulder (seam of the sleeve), edge to the front.

77. Officers mounted in executing the salute bring the sword in front of the middle of the breast and lower it in such a way that the right hand hangs down behind the thigh, the blade vertical, with the edge turned toward the horse, being behind the right spur.

78. Adjutants do not draw the sword. They render honors at "the present" and at the march past by saluting with the right hand.

79. First sergeants, etc., carry the officers' sword, but do not render honors with it.

Noncommissioned officers without officers' side-arms do not draw their own side arms when not carrying a rifle. At the "march past" they steady the side-arms with the left hand.

b. COMPANY.

In general.

80. Exercises in ranks, files, squads, and platoons are preliminary to company drills. The instructions specified for the company are applicable therein.

81. The company must be able to execute all the prescribed movements with certainty and precision, whichever rank is in front, whether the right or left wing leads, and when the squads have been faced about in deploying or turning.

Formation.

82. The formation is in two ranks. Two men, one standing behind the other, are called a file. The two tallest men form the first file on the right flank, the two next tallest the

second file, and so on to the left of the company. Slight deviations are allowable. In case there is an odd number of men, there remains a vacant place in the rear rank on the left of the company (blank file).

The rear rank stands parallel with the front. The distance between ranks is 80 centimeters from the back of the front rank man to the breast of the rear rank man.

In properly formed ranks, each soldier when at the order and without arms touches the man next to him lightly with the elbow.

83. Company in line (Pl. I). The company is divided into squads consisting of four files each, beginning at the right. In case a squad does not contain four files, the number should be increased to four by taking range finders from the line of file closers.

The company is divided into three platoons. In case the number of the squads is not divisible by three, one of the platoons will be larger or smaller than the other two.

Platoons consisting of more than three squads are divided into sections (half platoons). If there be an odd number of squads, the right section will be the larger.

In order to render the division into sections possible for purposes of instruction, a larger number of files can be made during peace exercises by forming blank files in certain squads.

84. Platoons are numbered from the right of the company; sections, squads, and files from the right of the platoons.

85. The company commander assigns posts to the officers. The three seniors take posts as platoon leaders on the right flank of their respective platoons in the front rank, the fourth takes post on the left flank of the company. Additional officers take posts behind the line of file closers, at a distance equal to that between the ranks.

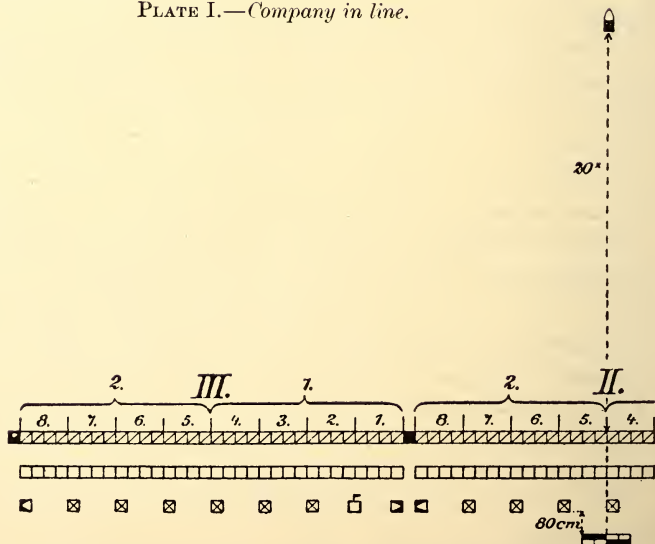
If there are no officers to act as platoon leaders, noncommissioned officers are assigned to act as such.

The company commander goes wherever his presence may be necessary.

86. Each squad contains one squad leader (noncommissioned officer or lance corporal). The leaders of the right and left squads of each platoon are at the same time the platoon guides

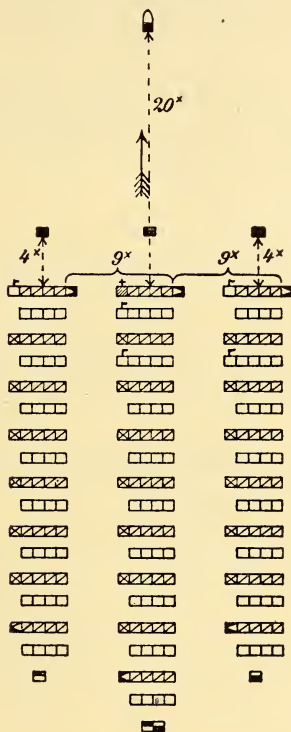
KEY TO PLATES I AND II.

- | | |
|-------------------------|------------------------------|
| Company commander. | File closer (squad leaders). |
| First lieutenant. | Range finder. |
| Second lieutenant. | Man in front rank. |
| First sergeant. | Man in rear rank. |
| Right guide (N. C. O.). | Bugler. |
| Left guide (N. C. O.). | Drummer. |

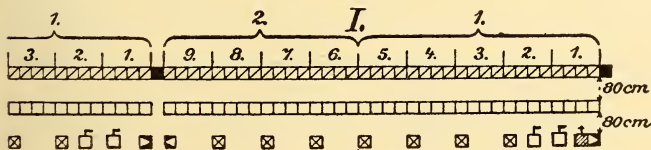
PLATE I.—*Company in line.*

If the color is with the company, its place is to the right of and alongside the platoon commander of the right platoon, the two noncommissioned officers who form the color guard being in the line of file closers.

PLATE II.—*Line of platoons in column of squads.*



1, The platoons can also be placed alongside of each other in column of twos; 2, the company commander regulates the position of the additional officers; 3, if the color is with the company, its place is two paces in front of the leading squad of the center platoon, one of the color guard being alongside and to the right, the other to the left.



(noncommissioned officers). The squad leaders stand in rear of the left file of their squads at a distance equal to that between the ranks, with the exception of the right guides (noncommissioned officers), who stand in rear of the right file of their squads, and who step into the place of their platoon leader as soon as he leaves his place. The left guide of the company places himself alongside the left flank man of the front rank if no officer is there.

87. Company column (Pl. II).

88. Platoon column (Pl. III).

89. Section column. Platoon column divided into sections, paragraph 127.

Supernumerary officers and the leaders of the right flank squads take post on the right flank of the sections.

Sections other than those with which the platoon leader is present are taken charge of by the senior squad leader if a supernumerary officer is not available for this purpose.

90. Column of squads (Pl. IV).

91. The march column (Pl. V).

At **Order of march** the march column, as shown in Plate V, is formed from the column of squads. The squads within the section (within the platoon if the number of files is small) march at a distance equal to that between ranks. The section chiefs, musicians, and nurses form fours in the spaces left vacant in the formation.

The depth of the column must not be increased unless ordered.

For the conduct of the march see Field Service Regulations.

At **Column of squads** the column of squads is formed as shown in Plate IV.

92. In column of twos (company in line faced to the right or left) the platoon leaders and the officer at the left of the company step on the left (right) side of their flank man alongside of whom they stood in line.

The same positions are taken in the platoon in column of twos.

Alignment; Touch of Elbow; Covering.

93. When the alignment is good each man whose position in the line is faultless, will see, by turning the head toward the dressing flank, only the man next to him on the right (left)

with the right (left) eye, and will catch only a glimpse of the whole line with the other eye.

94. Alignment and touch of elbow at a halt and on the march are toward the right, unless otherwise ordered.

Exceptions:

- (a) When the company is in line and moving straight to the front, it is on the leader of the middle platoon; with two platoons, on the leader in the center.
- (b) While moving in company column as well as when the squads have turned to the right (left) in platoon column, on the middle platoon.
- (c) While marching obliquely, it is on the flank in the direction of the march.
- (d) In column of twos, on the side of the platoon leader.
- (e) When turning, the alignment is on the marching flank and touch toward the inner flank, as prescribed in paragraph 136.

95. In company column the platoon leaders indicate the guide for their platoons. Within the company, alignment of the leading squads only is required.

96. In column the leaders on the directing flank cover and maintain distance so far as the ground permits. Only in platoon column are all files required to cover.

97. As soon as the command **At ease** is given at a halt each man must correct touch, alignment, and cover.

98. If the alignment is to be made at a halt, the command, **Dress (Eyes Left, dress)**, will be given.

The front rank dresses; the rear rank, the file closers, and musicians first cover and take distance, then dress. At **Eyes straight Ahead** (front) the heads are turned straight to the front.

99. For parade purposes the alignment can also be made at "the order" on posted guides. **Guides (X) paces to the front.** With the company in line, the right guides of platoons and the left guide of the company, and in the platoon column the right and left guides of the leading platoon, step the required number of paces, in front of their flank files, execute right (left) face and cover.

KEY TO PLATES III, IV, AND V.













 Company commander.	 File closer (squad leader).
 First lieutenant. Second lieutenant.	 Range finder.
 First sergeant.	 Man in front rank.
 Right guide (N. C. O.).	 Man in rear rank.
 Left guide (N. C. O.).	 Bugler.
	 Drummer.
	 Hospital attendant (N. C. O.).

PLATE IV.—

If the color is with the company, it is to the right and alongside of the platoon commander of the leading platoon when in platoon formation, the color guard being in the line of file closers; when in column of squads two paces in front of the leading platoon, one of the color guard being alongside to the right and the other to the left; in the marching column formation, in the first rank.

The positions of the company and the platoon commanders are regulated by field-service regulation. The company commander regulates the positions of the additional officers.

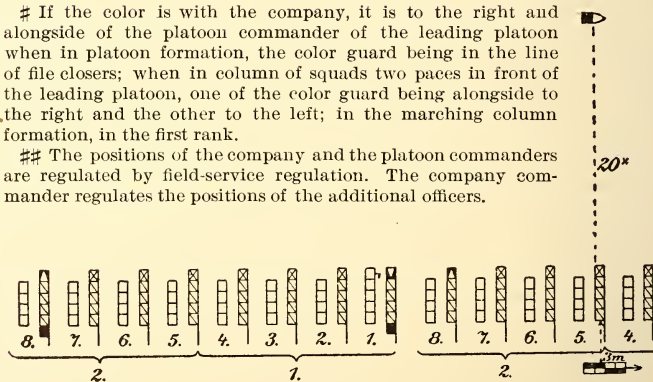


PLATE V.—

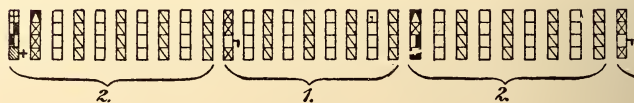
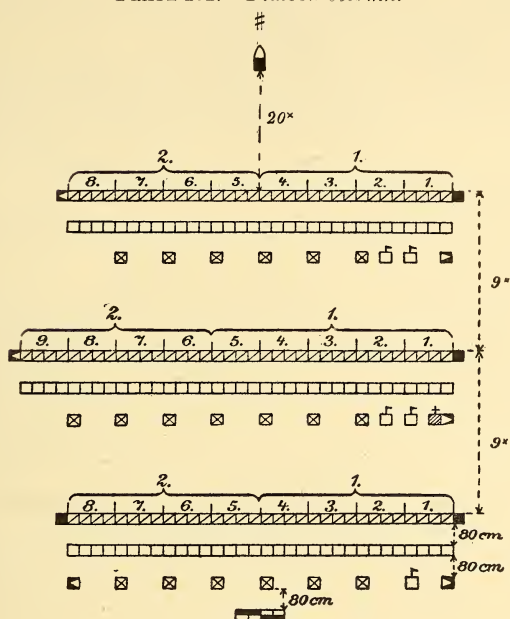
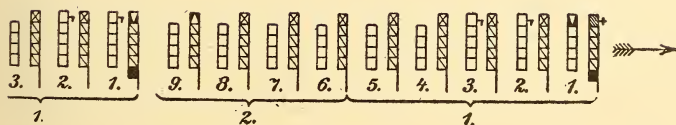


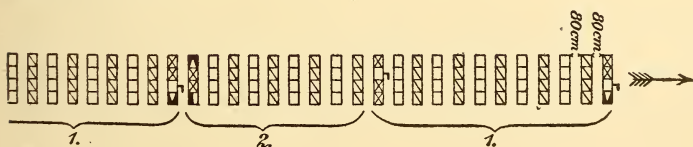
PLATE III.—*Platoon column.*



Column of squads.



Marching column.



If the color is with the company the color bearer steps to the front in place of the right guide.

At **Dress (Eyes Left, dress)** the company moves up, without regard to the step, to the line established by the guides, and dresses. In order to establish the line quickly the men are allowed to glance toward the flank opposite to that on which the alignment is made.

For the rear rank, the rear platoons, etc., see paragraphs 96 and 98.

At **Eyes straight Ahead**, the guides return to their places and all look straight to the front. The platoon leaders step out of ranks so that the guides can pass through.

100. The company must be able to align itself quickly and with certainty, "without command," on any desired file, squad or neighboring detachment, and also on a new front.

Facings, march by the flank and to the rear and manual of arms.

101. The facings and the manual are executed in unison; fixing and unfixing bayonet individually and as quickly as possible.

102. For purposes of drill in the facings, and marchings by the flank and to the rear, the preparatory command **Face** precedes the regular commands.

If this preparatory command is omitted, the platoon leaders and the officer on the left flank of the company take the places indicated in paragraph 92. In facing and marching to the rear they and the men in the blank files step up into the line of the rear rank. In both cases they remain in these places until the original front is again resumed.

At **Change front**, the front becomes the rear. Platoon leaders, file closers, and musicians take their new positions at route step and by the shortest line.

103. Colors and officers salute only at **Attention, present arms.**

Loading and Firing.

104. Loading is executed individually as quickly as possible. File closers and guides do not load.

105. When the company fires in close order, the company front must be approximately perpendicular to the line of fire. If necessary to attain this the company must be turned to the proper extent beforehand.

106. Two kinds of fire are employed, volleys and fire at will. Volleys are delivered by companies or platoons.

107. While firing, and when not merely a matter of drill, the company commander goes wherever he can best observe the effect of the fire.

When firing volleys by platoons the platoon leaders take post behind their platoons.

If file closers or musicians are in front of what is to be the firing line, they, at the preparatory command **For Firing** double time around the platoon flanks and take post in rear of the rear rank.

If "the ready" is taken from the "shoulder arms," officers, file closers, and guides come to "the order" at the preparatory command.

108. Not all the men of the company are always equally ready for firing. Some will have to take a clip from the cartridge box while others will still have cartridges in the magazine. If the volleys follow each other rapidly, it may happen that the same men do not fire at all the volleys.

109. The command **Cease firing** is repeated by all platoon and squad leaders.

All other details concerning Loading, Firing, and Unloading are regulated in accordance with paragraphs 45 to 59 inclusive.

To stack and take arms.

110. At **Stack**, the odd numbered files face to the left, the even, to the right. Each man places his piece with his right hand at the heel of the outer foot, barrel to the right. At **Arms**, the two men of the front rank first, and afterwards the two files lay their pieces with the ramrods together and then face to the front. The front rank steps one-half pace in front of, and the rear rank one-half pace in rear of, the stacks. The file closers lay their pieces on the nearest stack. The company stands "at ease."

111. To Arms. The front rank steps quietly to the front of the stacks, the rear rank to their rear, and stand "at ease." **Take** (the odd numbered files face to the left, the even, to the right) **Arms.** The men grasp their pieces with the right hand, disengage them without unnecessary force, face to the front, and stand "at ease."

Marching.

112. To march to the front. **Company** **March.** **Company** **Halt.** All march straight to the front. When marching in line, the leader of the guiding flank, and in company column, the leader of the guiding platoon is responsible for the maintenance of the proper direction.

In general the alignment must be maintained by means of uniform pace and proper touch of elbow. The man is permitted, however, from time to time to cast a glance toward the side of the guide. Pressure from the side of the guide must be yielded to, while from the opposite direction it must be resisted.

113. The company must be drilled in marching on directing points and in following the leader without command.

114. The company must also execute, without command, small turnings such as arise from slight shiftings of the directing point. In case of more material changes in the direction of march, the command designating the new marching direction precedes the command for the turn (paragraph 136).

115. If, while marching or after being halted, the command **kneel** or **lie down** be given, paragraphs 31-34 apply.

The company being in line or in platoon column the file closers step back one pace at "lie down," and at "rise" they step forward two paces. In company column, in column of squads, and in march column, the files, when lying down, take intervals of about half a pace from the center outward, the men of the rear rank placing themselves opposite the openings. After rising, touch of elbows is again resumed.

116. If the guide is to be shifted to the platoon leaders when marching in column to the rear (company column excepted), the command **Guide left** must be given. For "Change front" see paragraph 102.

117. Oblique march. **Right oblique** (**left oblique**) **March.** The men march keeping the shoulder of the one behind that of the other. The original direction is again resumed at **Left oblique** (**right oblique**) **March.**

The oblique march is to be made use of for short distances only.

118. The march in column of twos (92) is executed at route

step, the distance being increased to 80 centimeters. This distance is retained upon halting until further orders. For short distances this march may also be executed in step.

Changes of Formations and Turnings.

119. At changes of formations, officers, noncommissioned officers, and musicians take their prescribed places without delay as soon as practicable. (See also paragraphs 102 and exceptions, 138, and 139.)

If need be, the company commander gives orders therefor.

120. If a new formation is taken from the march in column of twos at route step, touch and distance are taken without command.

121. Distances and intervals can be changed in all columns by order of the company commander.

When intervals are changed while in company column, the platoons follow their leaders without command.

If the platoons become separated from each other by more than the width of the company in line, the command of the company commander ceases to affect the company as a whole.

PLOYMENTS.

122. Ployments are executed from a halt as well as when marching at route step or double time. When executed on the march, the march is continued at route step without command after the ployment is completed.

123. To form company column from line. If marching, **Company column Form (Form March, March)**. The squad on the right of the platoon continues the march. The platoons ploy to the right and then close on the middle platoon, which shortens step. If company column is to be formed on any other than the middle platoon, or if but two platoons are present, the command **Company column right (left) Form (Form March, March)** is given. Plying and closing in are executed toward the designated side.

124. To form platoon column from line. Being at a halt or on the march: **Platoon column Form (Form March, March)**. The center platoon stands fast and rectifies its alignment (or continues the march). The flank platoons are formed in rear of it by the shortest route (at double time),

the platoon on the right being in the center, the one on the left at the rear of the column.

If the platoon column is to be formed on any other than the center platoon or if but two platoons are present, the command **Platoon column right (left) ----- Form (Form ----- March, March)** is given.

125. To form company column from platoon column. Being on the march: **Company, column right (left) Form ----- March, March.** The right (left) squad of the leading platoon continues the march; the remaining squads of this platoon form behind it. The platoons in rear, while plying on the right (left) squads, place themselves abreast of and to the right (left) of the leading platoon.

126. To form column of squads from company column. Being on the march: **Column of squads ----- Form.** The center platoon continues the march. The outer platoons halt at the command of execution until disengaged, when they follow, the one on the right following first.

At **Column of squads, right (left) ----- Form**, the ploy is executed toward the platoon on the designated flank.

127. To form half-platoon column or column of squads from platoon-column and to form column of squads from the half-platoon column. Being on the march: **Half-platoon column (column of squads) right (left) ----- Form (Form ----- March, March).** The half platoons (squads) on the designated flank continue the march; the others place themselves in rear. The rear platoons, during the formation of column of squads, halt until they become disengaged.

128. To form column of squads from platoon or half-platoon column. Being at a halt: **Column of squads, right (left); Route step ----- March.** At the command **March**, the squad on the designated flank of the platoon (half platoon) in front, marches straight to the front. The remaining squads of this platoon (half platoon) place themselves in rear of it. The platoons (half platoons) in rear proceed in like manner as soon as they become disengaged.

DEPLOYMENTS.

129. Deployments take place either at route step or at double time. The subdivisions as they come up march

(double time) somewhat beyond the line of direction and take alignment and touch toward the one on which the deployment is made; the latter rectifies its alignment at a halt.

In column of twos, deployment is made on the flanking men situated at the front and side toward which deployment is made; in all other columns, on the leading subdivisions pertaining thereto.

130. The formation and, when necessary, the side toward which the deployment is to be made, must be designated in the command:

In squads	}	Deploy ----- right (left). Deploy ----- March. (March, March.)
In half-platoon column		
In platoon column		
In company front		

131. To form company front at a halt and on the march
(a) from company column: **In company front, deploy ----- March (March, March).** The platoons deploy to the left (execute left front into line), the outer ones gaining their interval at the same time. If the preparatory command contains the addition **Right (left)**, all the platoons deploy toward the designated side; at the same time they take their interval from the platoon situated on the opposite flank.

(b) From platoon column: **In company front, deploy ----- March (march, march).** The center platoon marches to the right, the rear platoon to the left.

If the preparatory command contains the addition **Right (left)**, deployment takes place to the designated side.

(c) From column of twos, squads, and half platoons; as a rule, platoon column is first formed and from this company front.

132. To form company column from column of squads: **Company column ----- Form.** The leading platoon stands fast (halts), the other two platoons place themselves alongside it by wheeling, the center platoon on the right and the one in the rear on the left (paragraph 137).

At **Company column, right (left) ----- Form**, the formation takes place toward the designated side.

If special haste is desired, the movement may be executed at double time.

133. To form platoon column from company column: **In platoon column, left (right) deploy** **March (march, march).** The platoon on the designated side deploys according to paragraph 129; the other two place themselves in rear of it.

The deployment is executed in the same manner when the platoon column has been wheeled by squads, or the files faced to the right (left).

134. To deploy the company in a different direction it is the rule when the angle is large to assume the new direction by command and then deploy.

The company commander may also, before giving the command to deploy, designate the point of direction or the amount of the turn—e. g., **Direction** on the top of the church steeple, or one-eighth (one-sixteenth) **Right (left) turn. In company front deploy** **March (march, march).** The leading unit takes up the designated direction and the ones in rear take it while deploying.

FORMING COLUMN OF TWOS.

135. Being on the march: **Form column of twos, right (left)** **Face.** The man on the designated flank continues the march straight to the front, his rear-rank man places himself to his right (left), the rest of the files place themselves in rear, executing by the right (left) flank. Half platoons and platoons in rear, halt until they become disengaged.

TURNINGS.

136. Turnings by units exceeding the front of a platoon are executed at route step or in double time.

Right (left) turn **March (march, march).** At **March**, the march is taken up if at a halt, and if already on the march, the turn is begun.

The alignment is toward the marching flank, the touch toward the pivot. The rear-rank men keep their heads straight to the front and cover their file leaders in marching.

The officer (noncommissioned officer) on the marching flank marches in the usual cadence and turns gradually toward the pivot. In case there is a large number of files, he first advances a few paces straight to the front before turning.

He keeps his eye upon the space he has to cover and from time to time glances along the line.

The man on the pivot gradually turns in his place at a halt, in proportion to the turn of the marching flank. If there is an officer or noncommissioned officer on the pivot flank, he dresses on the pivot file.

The men shorten the step to accord with their distance from the pivot, without stamping their feet and without raising their knees unnecessarily. Touch must not be lost; the pressure from the pivot must be yielded to, but resisted from the marching flank. At **Halt**, each man takes another step and halts. The preparatory command **Forward** ends the turn; marching is continued in the new direction with the half step. With the company in line and in company column, alignment is taken toward the leader of the guiding platoon; otherwise toward the guiding flank. At **March**, the march is continued at the prescribed pace.

While turning at double time, alignment need not be preserved.

137. If a column turns, the individual units execute the turn in the same place one after the other (moving pivot). The pivot is cleared by the turning units so that the pivot flanks describe a small arc, the distance from the unit in advance being diminished temporarily.

138. **Squads right (left) turn.....March. Halt or Forward.....March.** Each squad executes a turn of 90 degrees.

If when turning from the column of squads there are file closers on the side toward which the movement is to be executed, at the preparatory command they step behind the files (to the front when faced about) alongside of which they are.

Platoon leaders remain in their places when a turn is executed toward their side, unless ordered to the contrary.

139. When from platoon column "squads right (left) turn" has been executed, the officers, noncommissioned officers, and musicians at the command **Company column** take the places indicated in Plate II; when from company column "squads left (right) turn" has been executed, at the command **Platoon column** they take the places indicated in Plate III. If these commands are not given, the places previously occupied are retained.

140. From company in line: **Right (left) squad forward, squads right (left) turn..... March.** The designated squad moves straight to the front, shortening the step somewhat, all the other squads turning to the right (left). After the execution of the turn, the command **Halt** or **Forward..... March** is given.

The Charge.

141. If the company is to advance to the charge in close order, the bayonet is fixed and at the command: **To the charge arms..... Right,** the piece is brought to "trail arms" and the charge step taken up (see paragraph 65). The drums beat to the charge.

At the proper distance from the enemy the command **March, March** is given.

The drums beat to the charge continuously, while the buglers blow the signal "advance quickly."

Immediately before the assault the command **Charge..... Bayonet! Hurra!** is given. The leading rank charges bayonet, everyone continually huzzaing, rushes on the enemy for the hand-to-hand encounter, until the command **Company..... Halt** is given. The two front ranks bring their pieces to the "ready." If the enemy is beaten, a pursuing fire is, by command, opened as soon as possible, and if space is available, the troops are deployed.

B. EXTENDED ORDER.

IN GENERAL.

142. The change from close to extended order is effected through the formation of skirmish lines. In these the interval between skirmishers may differ. If the interval be not designated in the command, two paces are taken; if any other interval is desired it must be ordered. Loose skirmish lines result if the interval is greater than two paces, and compact ones if less. Very large intervals increase the difficulty of leading; the minimum interval must still permit the skirmisher the free use of his piece.

143. At every deployment of skirmishers the unit which is to deploy must be named and, when necessary, the direction of march and the guide designated. It is better to have the

guide "center." The unit on which direction is maintained is called the guiding or base unit.

144. In extended order the soldier is not bound rigorously to a definite place, nor to strict military carriage, nor is the handling of the piece to be strictly in accordance with the prescribed manual. On the contrary, he is required to be dexterous in the use of his weapon and in utilizing the terrain, self-reliant, and unremitting in attention to his leaders and observation of the enemy. Judgment, self-reliance, and boldness must be awakened in the breast of the young soldier and in the course of his service be continually strengthened.

145. Of especial importance is the thorough training of the minor leaders. Their position on the firing line must be such as is rendered necessary by the enemy's fire. All lance corporals and especially suitable men, are to be trained as squad leaders.

146. It is of fundamental importance to this training that the practical be placed above mere form.

a. INDIVIDUAL TRAINING AS MARKSMEN.

147. Only careful individual training furnishes a sure foundation for good service of troops in battle. It is as necessary in extended order as in close order and the instruction must be continual during the entire service of the soldier. The rifle must be placed in the hands of the recruit a few days after his arrival, in order to make him familiar with the use of his weapon. He must be instructed as soon and as often as possible on varied ground.

148. The marksman must at the beginning learn:

The fundamental principles of small-arms firing.

To examine and utilize the ground.

To see and recognize targets (training of the eye).

To estimate distances and to set the sight.

149. The principles of fire on the skirmish line are first demonstrated to the recruit by means of small detachments of men proficient therein.

His knowledge should be increased by a few participations in simple battle maneuvers and on the conduct of attack and defense, while confronted with an opponent.

150. When the soldier has made some progress in loading

and aiming, exercises therein are given on varied ground against objects of a military nature.

The soldier must be trained to load quickly, to adjust the sight rapidly and accurately, and to aim promptly and fire calmly against targets which are able to open fire quickly.

151. The accidents of the ground which afford cover from the enemy's sight only and those which also afford cover from his fire should be pointed out to the soldier. The value of field works should also be taught.

152. The soldier must be taught that the most important thing to be obtained is an effective fire, and that he must therefore subordinate all considerations of cover to this end and so place himself as to be able to keep the enemy constantly in view. It is only when he is actually aiming that the soldier is able to judge of the amount of cover he is able to utilize.

If firing is not to take place, the marksman must make use of cover in such a way that he will be screened both from the sight of the enemy and from the effect of his fire as much as possible.

153. In open country the marksman can not long remain exposed to the enemy's fire except in the lying position.

The power of observation and of recognizing objects while in the lying position must therefore be taught with particular care.

154. Attention must be paid to the different degrees of visibility of troops, depending on the color of their clothing and the background and light.

155. The skirmisher must skillfully overcome obstacles of every description. He must be trained particularly in leaping over or clambering through ditches, climbing over walls and hedges.

156. He must be taught how to advance stealthily by utilizing even the smallest depression of the ground and all cover. Even in the open country he must be able to advance by stooping and creeping, exposing himself as little as possible.

157. The marksman is trained in the use of the spade. He must learn to intrench himself quickly and, even when lying down, to provide cover rapidly.

158. It must be constantly borne in mind that the end and

object of all these exercises is to train the soldier to be a marksman who thinks for himself and acts with precision.

A firm resolve to inflict damage on the enemy and loyal endeavor, though unobserved and undirected, to do one's level best, are the foundations of superiority.

b. FILE AND SQUAD.

159. Files and squads in their strength and composition are the same as in close order. Surplus files belong to the nearest squad to the right. Each squad has a leader.

160. Skirmishing must be taught in the file and squad. They must be trained in:

- The different ways of deploying;
- Assembling and forming;
- Movements of the line, with increased and diminished intervals;
- Advancing by rushes and by creeping;
- Occupying a position;
- Loading in all positions of the body and while marching;
- Aiming in all positions at different ranges and from behind cover;
- The different kinds of fire, cease firing, and the transmission of orders and signals.

161. As soon as precision in the simpler movements is attained, the squad must be trained on varied ground. The principles remain the same as for individual training, except that the squad must be considered as a whole and attention to the leader taught.

162. The training of the squad leader requires particular care. He is the assistant of the platoon leader and at the same time the leader of his squad. He must be trained in using field glasses for identifying the target and for observing the effect of fire, in estimating distances quickly and reliably, and in giving commands.

163. He must be able to lead the skirmishers of his squad within the space allotted to them, keeping them under cover as much as possible, and rapidly and skillfully bringing them into position. He must constantly supervise the setting of

the sight, the distribution, careful delivery and rapidity of fire, and the expenditure of ammunition.

164. When the platoon is in extended order, the same conditions of cover and movement do not usually obtain along its entire front. The enemy's fire will frequently make uniform movement of the platoon impossible and fire control difficult. Therefore the squad leader must be able to conduct the fire of his own squad, to utilize, without command, every opportunity which presents itself for approaching the enemy, and to support each movement of the neighboring squads by means of his fire.

165. The squad leaders themselves fire only when their other duties permit it; conditions will often allow this in a long-continued fight in the same position.

C. PLATOON.

The platoon commander.

166. In extended order the platoon forms, as a rule, the unit of command and fire control.

167. The platoon commander orders the formation of the skirmish line, the direction of march, and, when necessary, the guide. He determines the intervals according to the purpose of the battle, the space to be occupied, the distance from the enemy, and the nature of the ground.

168. In defense, he places his platoon in position and makes all preparations for opening fire.

169. In attack, he endeavors to advance, with as little loss as possible, to a position where he can successfully begin the action. With this purpose in view, he leads the skirmish line forward, without undue extension, as long as the nature of the ground allows and the fire of the enemy permits. Open stretches can be passed over by running.

If such a method of advance is impossible at the outset on account of the character of the country, or if it must be abandoned because of the enemy's fire, the platoon commander can form very open half-platoon or squad skirmish lines and permit them to follow each other at irregular distances, always remembering that he must unite the platoon when under cover in order to control it when opening fire.

170. After the platoon has opened fire, well prepared platoon rushes, supported by the fire of neighboring units, form the simplest and quickest means of advancing.

When platoon rushes become difficult, subdivision of the front into smaller units advancing alternately will become necessary. The manner in which the half platoons or squads then advance will be irregular and varied. They can, while rushing forward, spread out as much as the fire of the neighboring detachments permits and again unite under cover. They can advance by file or even individually, and also gain ground by creeping.

The platoon commander must continually bear in mind that the most effective aid to an advance lies in superiority of fire. He must therefore always keep his platoon in hand so as to control its fire and movements and so that his personal influence may be felt.

171. Attention to utilization of the ground must not divert the attention of the platoon commander from the enemy nor shift the designated direction of attack.

Adjacent units must not be hindered in their movements or fire.

In no case must the taking of cover by the individual interfere with the action of the unit as a whole.

172. When the platoon commander can gain an advantage or utilize an opening afforded by the enemy he is bound to act on his own initiative; but it must be perfectly clear to him, taking into consideration the whole command, how far he may properly operate independently.

173. The platoon commander is responsible for ascertaining the correct ranges. He keeps two range finders (men who estimate distances) close to him, and they, unasked, inform him of the result of their estimates. He also utilizes the estimates of squad leaders who are near to him. Special training is necessary in order to obtain uniform results in estimating distances.

The range finders also aid the platoon commander by observing the enemy and their own adjacent troops, as well as by maintaining communication with the company commander in so far as this is not done by the musicians (par. 221).

The platoon commander permits the range finders to take

part in the action only when their duties as range finders have become of secondary importance.

FORMATION OF A SKIRMISH LINE.

174. The formation of the skirmish line must be executed quickly from any formation in close order, in any direction and with the utmost order and silence. It is executed when in line on the right squad of the second section, and when in column of squads on the leading squad. Otherwise the guiding or base squad must be designated in the command.

The platoon in column of squads can also be formed in skirmish line by deploying toward both flanks instead of one. The squads of the leading section then deploy to the right while those of the rear section deploy to the left on the leading squad of the platoon.

175. At the command to deploy the piece is carried as for the charge and then at will at the balance, muzzle elevated, or under the arm. The sling may also be lengthened.

The piece may also be slung when it is important to have the hands free, e. g., in thickets, on steep slopes, or when creeping.

176. If a platoon is to deploy to the front from a halt or on the march, the command **(X) Platoon Deploy**, or **(X) Platoon, on (X) Squad Deploy**, is given. At **Deploy**, the squad leaders spring quickly to the front and form the skeleton of the skirmish line. The leader of the base squad goes straight to the front or in the designated direction, shortening the step; the remaining squad leaders hasten to the front at a right or left oblique, depending on their position with reference to the base squad, and take their interval from the adjacent squad leader in accordance with the interval given in the command for the deployment.

The skirmishers follow their squad leader at a distance of 10 paces. The men of the rear rank step to the right of their file leaders, each man taking 2 paces interval.

If a greater or less interval is to be taken, the platoon commander so commands, e. g., **(X) Platoon with four paces interval (with half a pace interval) (without interval) Deploy**.

The platoon commander indicates to the leader of the base squad the direction of march and, accompanied by the range

finders and the musician, goes at least 10 paces in advance of the line of his squad leaders. As a rule he is in front of the center of his platoon, but may change his position at will. He must be quick witted if he desires to lead skillfully in the field, avoid collision with the adjacent platoons, and at the same time observe the enemy.

177. If the deployment is to be made obliquely to the front or toward the right or left flank, the new front is assumed before deployment. Designation of the direction can, however, also be given in the command to deploy, e. g., **(X) Platoon, direction right oblique on the windmill Deploy.**

The leader of the base squad immediately takes up the new direction.

178. If a platoon is to deploy without advancing to the front, the command, **(X) Platoon (on X Squad) on line Deploy** is given. The squad leaders form (according to paragraph 176) the skeleton line in advance of the front of the platoon in close order taking the position they are to occupy. The squads place themselves behind their squad leaders. They do not move up to the line of squad leaders until the command, **Form** (par. 186).

179. If the deployment is to be made rapidly, the command **(X) Platoon March, March, deploy** is given.

180. If a platoon marching to the rear is to deploy, it should, as a rule, be first faced to the front and then the command, **(X) Platoon on line Deploy**, given.

MOVEMENTS AND TAKING POSITION OF A SKIRMISH LINE.

181. An important object in the training of skirmish lines is the maintaining of systematic movements of the lines for long distances and in difficult country while retaining the direction of march. With perfectly trained troops verbal commands are frequently replaced by signals. No value is to be attached to the exact maintenance of equal intervals or the observance of dress.

182. The skirmish line moves forward with a free, natural pace and at the usual cadence. On stepping off the pieces must be locked and the cartridge boxes closed without command.

183. Platoon and squad leaders are in front of the skirmishers when moving to the front or by the flank, i. e., toward the enemy. When marching to the rear the squad leaders go to the side furthest from the enemy and take up the direction of march. The platoon commander, however, remains on the side toward the enemy.

184. The movements of the skirmish line consist of the march to the front, or to the rear, of the entire platoon or of individual units; **(X) Platoon (half platoon).....March (March, March) (to the rear, march);** for small shiftings to the flank: **right oblique (left oblique).....March;** in movements by the flank—behind cover and out of the enemy's fire.....; **By the right (left) flank.....March.**

185. Small changes of direction of the march of a skirmish line requiring a turn are executed either by declaring a new direction of march, or are begun by a turn at a command which also designates the new direction of march, e. g., **Right turn, march, direction, the tall poplar.**

Larger turns are executed by gradually deploying in the new front. With long lines échelons will result from this movement; rectification takes place gradually or at the next halt (par. 286).

186. When the opening of fire is not contemplated, the movement is stopped by **Halt** or **Lie down (kneel)**. Platoon and squad leaders remain in advance of the line.

The command **Form** is given when it is desired to commence firing from the march or at the halt. The skirmishers move forward until they arrive on a line with the platoon leaders. If possible, the sights should be set beforehand.

187. If, after the occupation of a position, fire is not opened immediately or a pause in the firing takes place, the platoon commander may allow complete cover to be taken. He directs who is to take charge of observing the enemy. At **Form**, the skirmishers come to the "ready."

188. To advance by rushes, the command **(X) platoon (half platoon) (squad) rush..... Forward March, March** is given.

At **Rush**, the skirmishers complete the loading, lock pieces, close cartridge boxes, and prepare to rise. Skirmishers lying down take the piece in the left hand, lean on the right, and draw the right knee as close to the body as possible without thereby raising the upper part of the body from the ground.

After a short pause, which serves to complete these preparations, the platoon commander, while rising, gives the command, **Forward March, March**. Hereupon the skirmishers jump up and rush forward. The length of the rush can seldom be more than 80 meters (paragraph 337). Even though rushes are, as a rule, to be made as long as possible, yet short rushes, made so as to afford no time for the enemy to fire, must also be practiced. The main points to be observed are a quick and simultaneous rising and a rapid rush forward.

189. The rush is completed according to paragraph 186, the sight, when necessary, is changed, and fire resumed without command.

Frequently the new firing position can be designated before the rush.

190. If, upon arriving at the position selected by the platoon commander, it becomes apparent to him that many of the skirmishers must kneel or stand in order to fire on the enemy, he must try to continue the advance to a better position. If this is impossible, he can, if the circumstances of the battle permit, temporarily suspend the fire.

191. The attack by a skirmish line is executed according to paragraph 141.

Kinds of fire and commands.

192. Only a skirmish line actually in position fires.

193. As a rule fire is delivered at will.

The use of volleys is restricted to exceptional conditions. They are useful when an enemy is surprised or for obtaining better control of one's own troops.

194. Commands for both classes of fire must be as brief as possible. They fix first the direction, then the object, range, and kind of fire. The object must be clearly designated.

Detachments of the enemy must be designated just as they appear to the skirmishers, e. g., "The gun farthest to the right" and not "The gun on the left flank of the battery." After the object is designated and the sights fixed, fire is commenced by the command, **Fire at will**. Volleys are delivered by command.

At Skirmishers straight ahead: At 800 [meters]: Fire at will.

At Cavalry right oblique: At 900 [meters]: Fire at will.
At 700 [meters].

At Right oblique, columns on the green knoll: At 1,000 [meters]: Ready: Aim Fire: Load.

195. If two ranges have been used and only one is to be changed, the designation of the range is discontinued in the command. If, for example, firing has taken place with ranges of 1,100 and 1,200, the command **Change 1,200 to 1,000** is given.

196. The rapidity of fire is left to the choice of the skirmisher in fire at will. Good training and careful development will insure the proper use of this liberty.

The skirmishers should be required to aim carefully at the designated object. The necessity for accuracy determines in a measure the rapidity of fire.

Adjacent skirmishers will assist each other in observing the enemy and the effect of fire. In rapid fire at will speed is attained by accelerating the loading and aiming movements, as well as by shortening the time used for observation.

If the leader considers a decrease or increase in the rapidity of fire desirable, he commands, **Slower (quicker) fire.**

197. To stop the fire at will, the command: **(X) Platoon, Cease Firing,** is given. The command is repeated loudly by all the squad leaders, and if not then heard throughout the line it is repeated by all the men who have heard it.

At **Cease Firing**, fire and loading are discontinued at once. Skirmishers who are in the act of aiming recover arms. Absolute silence and attention must be given to the commands that follow. If fire is to be resumed at the same object, it is not again designated, but the command is given: **Continue firing.** If an interruption of the firing takes place, this is relieved by **Continue loading** (paragraph 50).

Effect of fire.

198. Fire effect depends on the number of pieces and their proper handling.

Flanking fire is particularly effective at all distances and against all objects. The more concentrated the fire and the more it is in the nature of a surprise, the greater effect it produces.

199. The effectiveness of the fire of skirmishers depends, apart from the degree of their training and practice, on their bodily fatigue and mental excitement.

Fire direction and control.

200. Fire must be controlled as long as possible in order that the commander may be able to direct it.

201. On the firing line orders and commands are heard with difficulty on account of the noise of battle. Orders must, therefore, be repeated by each squad leader, and if this does not suffice, then they must be transmitted from man to man. For this the squad leaders are held responsible; they must indicate that they understand the order by raising their hand.

202. Accurate estimation of distances is the foundation for accurate fire. It can be supplemented, but not replaced by the aid of a range finder, by means of maps, and by information obtained from artillery or infantry actually engaged.

203. Opening of fire depends primarily on the tactical situation. The determination of the time to open fire, as a rule, falls on the commander of the foremost line.

It is a fundamental principle that fire is opened only when profitable effect can be expected from it, or when a further approach to the enemy without the support of fire requires too great a sacrifice. Opening fire too early betrays uneasiness and a lack of confidence. The expenditure of ammunition without adequate effect is a useless and therefore detrimental expenditure of one's own strength. An ineffective fire increases the confidence of the enemy.

204. Tactical considerations are paramount in the choice of a target. A frequent change of target dissipates strength.

Reenforcements of the enemy which move up from the rear to the skirmish line under fire will, as a rule, cause no change of target, as they must pass through the zone where they are exposed to the scattering bullets.

205. The object must be so designated as to enable the skirmisher to find it quickly. If the object can be seen only with field glasses, a zone of the ground must be indicated as the target. It is also recommended that field glasses be passed among the men.

206. The division of fire along the front of the enemy is of special importance. To the subdivisions, therefore, the zones in which they are to distribute their fire are exactly specified. In order that no portion of the enemy's line may escape fire, small overlaps are recommended. In general, each division and each skirmisher fires against that part of the enemy directly in front. However, cross fire must not be neglected.

The fact that some parts of the enemy's front are less visible than others must not cause the skirmishers to neglect them and to fire exclusively at the more visible parts. This must not be held to prohibit taking advantage of particularly favorable circumstances for fire action, e. g., rushes of the enemy.

207. The rapidity of the fire is regulated by the conditions and purpose of the battle, the available ammunition, and the nature of the target. Long range, unfavorable light, and difficulty in seeing the target must diminish the rapidity of fire. During the greater part of a long-continued action economy of ammunition is required.

Generally considerable increase in the rapidity of fire decreases the accuracy of the individual shot and increases the depth of the sheaf. But the conditions and purpose of the battle and the movement of the enemy will often require increased rapidity of fire in order to attain greater effect in a shorter space of time, and thus justify a larger expenditure of ammunition.

The skirmishers must be trained to recognize and take advantage of such situations of their own accord.

208. The utmost rapidity of fire is required: In the attack during the last preparation for the charge; in the defense to check the enemy; in repulsing cavalry, and in all phases of the battle in which a sudden and close encounter with the enemy takes place; in pursuit.

209. The effect of fire must be continually observed by the use of field glasses. The leader must endeavor to ascertain if his dispositions are correct by observing the strike of the bullets and the conduct of the enemy.

If direct observation from the firing line itself is interfered with, observers can be placed to the side or in rear, who will transmit their observations by concerted signal.

210. Fire discipline supplements fire control. It comprises the conscientious execution of orders that are given in action, the precise observance of the prescribed instructions for the use of the piece, and for the conduct of the individual in battle.

This embraces: Taking advantage of the ground; care in setting the sight and delivery of fire; constant attention to the orders of the leaders and careful observation of the enemy; an increase in the fire when the target becomes favorable, and a cessation of fire when the enemy disappears; economy of ammunition.

If during the course of the battle, it becomes impracticable to exercise perfect fire control, or if fire control of any kind becomes impossible, each man must preserve presence of mind and act deliberately, choosing his own target and range.

In order to insure independent action, the men must be accustomed to battle conditions in which fire control is wanting and trained to act properly in such cases.

Closing up; Assembling; Forming.

211. The most effective way to avoid the mixing of subdivisions in battle is to cause each unit to close up the gaps toward its leader when losses take place.

Squads which have suffered greatly unite with adjacent squads under a common leader.

This closing up can, as a rule, be executed only while on the march. It must be done gradually and the prescribed intervals must be maintained. Crowding on the firing line increases the losses and causes dangerous gaps along the front.

212. If, in the course of a fight, it is no longer desirable to retain the extended order each leader, beginning with the squad leader, must assemble his detachment at once and place it under the control of the commander of the next higher unit.

Without awaiting orders the leaders must promptly form their units in close order.

213. To pass from a skirmish line to close order the command: **(X) Platoon (squad) Assemble** is given, or signals may be used (par. 11).

If not otherwise specified, the platoon is assembled in line, the right flank opposite the platoon commander. While

being conducted to their places in line the squads close in behind their squad leaders at the "shoulder arms" and arrive at the platoon in close order, where the squad leaders cause them to take the "order arms."

The assembly is executed in silence and if at the halt, with the front continually toward the enemy.

If the assembly takes place on the march, the assembled squads close in behind the platoon commander at the "shoulder arms."

When marching to the rear, the platoon commander places himself on the side toward the enemy as soon as the march is begun.

The new units created during the course of the battle remain as such until an opportunity offers which permits of "forming."

214. If during or after assembling the original units are again to be formed, the command: **(X) Platoon in line** Form is given. The skirmishers, without first forming subdivisions, resume their original places in line, behind the platoon commander.

d. COMPANY.

The Company Commander.

215. The company commander regulates the employment and the cooperation of the platoons. He decides which part of the company shall be deployed, and gives the necessary instructions to it and to the part remaining in close order. He selects the best position from which to direct the company.

216. If the company commander is on the firing line, he selects and designates the target and gives orders for opening fire. He announces the range found by the range finders and carefully watches the effect of fire. The fire control, however, he leaves to the platoon commanders, and only interferes when he desires to utilize the fire effect of several platoons or of the whole company, or when he believes that certain occurrences have escaped the observation of the platoon commanders.

The skirmish line.

217. The formation of a skirmish line, its movement and position, are regulated according to paragraphs 174 and 191.

The platoon commander gives the command for the deployments. (Exception, see paragraph 220.)

218. If several platoons deploy simultaneously, one of them must be designated as the base. As a rule the guide in each platoon is center. It is the duty of the commander to regulate the march of his platoon on the base platoon. When this becomes impossible, the platoons adjacent to the base change their guide from the base platoon to the flank squads.

219. If the company commander sees beforehand that he will have to employ several platoons simultaneously, he first causes them to take the proper interval, so that on deploying they will be in rear of the places they are to occupy.

220. To deploy the entire company simultaneously, the company commander commands: **The whole (X) company----**

Deploy. If the company is in line or in company column, it deploys on the center platoon. If it is in platoon, or in half-platoon column, or in column of squads, the leading platoon deploys at once, the rear platoons marching out to the right and left and deploying from their outer flanks (paragraph 131).

If the company commander desires to deploy the company to one flank only, he commands: **The whole (X) company to the right (left)-----Deploy.**

221. The musicians of the company are used during the battle to maintain communication between the company commander and the platoon commanders. One of the musicians accompanies the company commander; the other three are assigned to the platoons. (NOTE.—The musicians must be trained in signaling.)

The support.

222. That part of the company which is held back is called the support. It serves either to extend the fighting front, to close up gaps to reenforce the firing line, or to cover the flanks. Its position is regulated in accordance with one or another of these requirements.

223. The distance of the support from the firing line depends on the nature of the ground and the tactical situation.

The timely reenforcement of the firing line is most essential. On that account the support must keep as close to the firing line as possible, but it must also avoid unnecessary losses.

Visual communication must be maintained between the support and firing line. On this account it may be necessary to establish intermediate posts from the support in broken or wooded country.

224. The support regulates its formation according to the nature of the ground and the effect of the enemy's fire. In country affording cover it may be led forward at attention and in close order. Over open country, swept by the enemy's fire, it will frequently have to advance in extended order and also by rushes. It may be divided into squads and may also utilize favorable ground by moving temporarily to a flank.

225. The commander of the support must observe the movements of and conditions existing at the firing line in order that he may support it to the best advantage. If it has been necessary to subdivide the support during the advance, it must be reunited as soon as possible.

226. The reenforcement of the firing line takes place by extending it or by putting men in the intervals. The units designated for this purpose deploy and place themselves in prolongation of one of the flanks of the firing line or move up between the skirmishers. The men on the firing line call out the range to the reenforcement.

It may also be the purpose of a reenforcement to push forward a firing line that has been brought to a standstill.

227. The reenforcing of the firing line must be regulated from the beginning by designating to the support the extent of front which it is to reenforce and the gaps which it is to fill. Crowding together of the skirmishers must not result from a reenforcement.

When the reenforcement reaches the firing line the skirmishers thereon must not be compelled to move to make room for it.

228. The company must be taught to form new units quickly. In doing this the platoon commanders and squad leaders distribute themselves along the front.

The training must be so thorough that even when new units are formed control of the men and well regulated fire control will be quickly regained.

Closing up; Assembling; Forming.

229. To close up, assemble, and form the company, the same principles apply as for the platoon (paragraphs 211-214).^a

230. As a rule the company commander orders the assembly on one of the platoons. The platoons then assemble individually and form platoon column, but they may also combine the two movements. In executing these movements the shortest routes must always be taken.

231. If the company commander desires to assemble the whole company near himself, or on the march, behind himself, he commands **(X) company assemble, or Assemble, March, March.**

At this command officers and men direct their march on the company commander and, while gradually closing up into squads and platoons, form platoon column (paragraph 213). If units could not be formed in close order while advancing, they are so formed upon being assembled. New units are formed after the assembly has been completed. The platoons are placed in their proper order after being assembled.

232. To restore the original units, the command **(X) company in platoon column Form** is given.

Any other formation may be chosen.

2. THE BATTALION.

233. The battalion commander leads his troops by means of orders to his subordinate commanders. If he desires, in special cases, that the order refer to the battalion as a whole, he must so specify.

234. The companies may form one behind the other in platoon or company column; column of companies in company column (Pl. VI), or alongside of each other in line of companies, line of companies in company column (Pl. VII).

The positions of the leaders, intervals, and distances between companies can be changed as required.

Column of companies is used in assembling, and together with the column of squads, for the marching column.

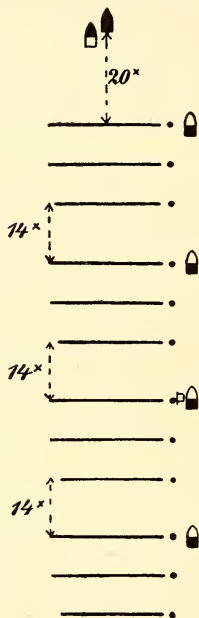
The line of companies is used (except at parades) at formations in which it is of importance to lessen the depth.

235. Any other formation is permissible when the purpose and space require it.

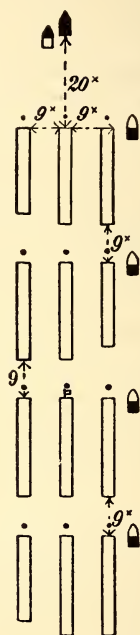
236. The color takes the positions indicated in plates 6 and 7, even when the third company of the battalion is not in the position shown. Two color-guard sergeants stand behind the color bearer.

PLATE VI.





Column of companies.



Column of companies in company column.



KEY TO PLATES VI AND VII.

-  Battalion commander.
-  Company commander.
-  Battalion adjutant.
-  Platoon commander.

NOTE.—Supernumerary staff officers join only at parade.

When deploying for battle, the color remains with the company with which it happens to be. It goes on the firing line with the last platoon of that company. One squad must remain with the color under all circumstances.

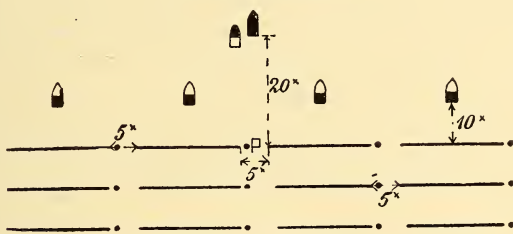
237. Guide and touch are toward the right when at a halt. When marching in column of companies, toward the right; in column of companies in company column, toward the center platoon; in line of companies and in line of companies in company column toward the color.

238. For parade purposes, the guide is taken on men posted as guides (noncommissioned officers). (Paragraph 99.)

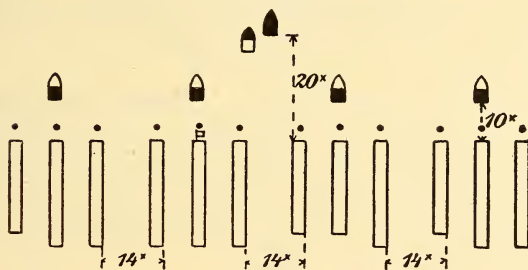
239. The movements of the battalion in close and extended order, as well as of the company in forming extended order in the battalion, take place at route step.

PLATE VII.

Line of companies.



Line of companies in company column.



On the battlefield attention is to be taken up as soon as it is necessary for the maintenance of order and discipline.

Cadence is required only within the company.

240. Movements and changes in the direction of march of the battalion in close order are executed according to the principles prescribed for the company.

At the command of the company commander, turns, when changing direction in column of companies, are executed on a moving pivot. (Paragraph 137.)

241. The formation of the battalion determines the methods for its extension.

The battalion commander determines the front, the base company upon which the extension is to be made, and its conduct. He then orders the additional arrangements. If the deployment is made from a halt, the distances are to be gained as soon as the battalion is put in march.

On the march the deployment is executed on the leading company, which then becomes the base.

From the marching column the deployment is executed most easily by changing the direction of march of the head of each company.

The companies proceed by the shortest routes. Companies on halting come to "the order" and then stand "at ease."

242. The movements of the battalion in extended order are regulated on the base company.

The character of the ground and the tactical situation may render it necessary for the company commanders to alter, temporarily, the intervals and distances. They select, on their own responsibility, the proper formations in executing the movements.

As the troops enter the fight, the importance of guiding on the base company gives way more and more to the requirements of the action.

243. The change of direction of a battalion in extended order is executed by indicating to the base company the new direction. The companies turn in the new direction and again resume their former relation to each other if the battalion commander does not order a new arrangement. This will generally require several changes.

244. The assembling of the battalion on the company designated by the battalion commander takes place by the shortest routes.

3. THE REGIMENT AND THE BRIGADE.

245. Regimental and brigade commanders lead their troops by means of orders transmitted to their subordinates.

246. In the regiment the battalion is formed in one or more lines. In the brigade the regiment is formed in units placed side by side and in successive lines, and also when necessary in well separated groups.

The formation, intervals and distances of the units, as well as the positions of the commanders, are regulated according to position, purpose, ground and space.

247. When neither the enemy nor the country need be considered, the battalions are arranged, as a rule, in column of companies with 30 paces interval and distance.

The regimental commander is 25 paces in front of the center of his regiment, the brigade commander 50 paces in front of the center of his brigade.

248. In assembling regiments and brigades the movements must be executed without one organization interfering with another. The joint relationship must be maintained while skillfully taking advantage of the character of the ground.

When necessary a base battalion must be designated.

249. The formation of regiments and brigades in extended order, the movements of the units, and the assembly take place according to the principles prescribed for the battalion.

It is generally necessary to point out to the units of the regiment and brigade in extended order the direction of march.

Part II.—THE COMBAT.

INTRODUCTION.

250. The regulations take into account the simple tactical relations which form the rule in time of war.

There are, however, cases for which general instructions can not be given. The leaders must therefore be trained to adapt their instructions quickly and without hesitation to individual cases.

251. In collective training the purpose kept in view is to develop the self-reliance of the leader and of the individual skirmisher. Battle exercises approach the reality if the unit concerned has opposed to it a unit which conducts itself as in war.

On this account exercises of troops against troops are most instructive.

(For indicated troops, see Field Service Regulations.)

252. In minor exercises umpires, by frequent criticisms on the manner of solution, supply the impressions and

influences of war which are wanting in peace, contribute to the development of independent action on the part of subordinates, and help to give these exercises a warlike character.

(For the duties of umpires at exercises with larger units, see Field Service Regulations.)

253. Maneuvers can not be conducted as slowly as actual battles. Too quick a course develops peace tactics which would find no application in war. Commanders and umpires, when necessary, must prevent too great a rapidity of execution.

254. The inclination to simplify matters by a recourse to measures impossible in war must be always resisted. The greater the number of difficulties to overcome the better will be the instruction, and the more will the worth of independent action be recognized and prized. The practice of forming predetermined plans of battle is forbidden.

255. The proper execution of maneuvers under service conditions depends on the choice of correct formations, while at the same time taking advantage of the nature of the ground. The greatest advantage must always be taken of conditions which favor the development of our fire while lessening that of the enemy.

256. The infantry must fight over any ground which can be crossed by a vigorous man, and must be able to overcome obstacles when fully equipped.

257. At maneuvers all leaders must give their orders from the places and in the positions that they would have to take in actual battle. This also applies to mounted leaders.

The commander may always personally deviate from this rule and may allow his subordinates to do so, if this should be required for the better training of the troops.

258. The principles governing the employment of infantry in battle are best taught by placing them in simple tactical situations. The most elementary exercise consists of a combat with one company on each side. It is the most frequent case in war and requires the most skillful use of ground.

259. Where the combat can not be carried out as a whole on account of too restricted a space it must be executed in phases.

260. Night exercises, with small or larger units, must be practiced. In this case the point is not so much to carry out

all the phases of a combat as it is to occupy a designated position in order and silence where there are no roads.

261. The use of fieldworks must be learned early. In case there is no suitable ground at the station of the troops to use intrenching tools, the maneuver grounds must be utilized for this purpose.

Where the peace-time conditions prohibit the building of fieldworks indicated by tactical conditions, the preparatory steps at least are to be taken and the work indicated.

262. At inspection the inspector sets the task; he tests the tactical training of the troops, particularly that of the leaders, and convinces himself that the subordinate officers properly apply the principles of fire direction and that the individual men act intelligently in the absence of fire direction.

263. All leaders must be specially trained to economize the strength of troops at every opportunity. This is essential in order that they may be able to exert themselves to the utmost when necessary, and at the same time to withstand great deprivations. Dissipation of strength lessens chance of victory; therefore each unnecessary step lessens the chance of success.

264. Infantry is the principal arm. In unison with the artillery, it overcomes the enemy with its fire. Alone, it breaks down the last resistance; it bears the main burden of the battle and suffers the greatest losses. For these reasons it also wins the greatest glory.

265. The infantry must cherish its inherent desire to take the offensive; its actions must be guided by one thought, viz, forward upon the enemy, cost what it may.

This requires a high moral standard in the troops. Firmly to establish and increase it is the essential purpose of peace training.

A well-trained, well-led, and resolute infantry which is strong in determination has a good chance of success, even under difficult conditions and against an enemy superior in numbers.

266. The officer is the model for his men; his example draws them forward. He maintains the strictest discipline and leads his men to victory even after stupendous exertions and heavy losses. He must be a faithful helper to his men and share

with them joy, sorrow, and deprivations, and thus gain their implicit confidence. In peace the officer must fit himself by thorough preparation for his important duty in war.

267. The noncommissioned officer assists his commander and must take his place when necessary. Upon his trustworthiness and loyalty rests the cohesion of the company.

268. The soldier must, after strenuous marches and privations, preserve in battle his courage, energy, judgment, and rapidity of decision. By means of gymnastic training and fencing men should be taught to think little of themselves, and to be audacious. They should be hardened to bodily fatigue and be familiar with the simple formations for combat. They must be taught that there is nothing more dangerous than to turn the back upon the enemy.

The soldier who, in the press of battle, feels that he is losing his determination and good judgment must look at his officers. If these have disappeared there will remain noncommissioned officers and brave soldiers whose example he can follow.

269. Each soldier must endeavor to remain with his detachment. An unwounded man who is found idle behind the fighting troops, or who, without express orders, carries wounded from the fight, or who leaves the battlefield under any pretext whatever, renders himself liable to be considered guilty of cowardice.

270. When a man becomes detached from his company he must join the nearest unit and obey the superior of that unit as he would his own. After the battle each soldier who has become detached from his unit must immediately search for it and give an account of his absence.

271. If, in battle, units have become mixed, order must be restored as soon as possible by the creation of new units.

LEADERSHIP.

272. Fixed rules for leadership which are of universal application can not be given. In each individual case the leader must be clear in his own mind as to the proper manner of conducting the combat and form his plans accordingly. These plans he must not abandon without cogent reasons.

273. If the actions of the commander are not fixed by the situation, or by orders, he must determine whether he will

fight an offensive, defensive, delaying, or any other sort of combat; or whether he will refuse battle by marching away. His orders must clearly express his intentions.

The commander must find ways and means to transmit his orders to his subordinate commanders even to those of the lowest rank.

274. In preparing orders for a battle the commander must not let preconceived ideas influence him, since no exact plan can be prescribed for a conflict.

Usually troops should be moved quickly in the desired direction by verbal orders. The more detailed instructions will come later. For the brigade and higher, these will generally be given in writing.

275. Superior commanders must limit their orders to those necessary. They must avoid going into details and leave to subordinate commanders the choice of methods. Their orders and instructions are to be addressed principally to the commanders immediately subordinate to them.

This must not prevent the commander from giving his orders directly to subordinate units where the conditions require it, where there is a lack of time, or where the conduct of a subordinate commander threatens to endanger the purpose of the fight. Such interference must immediately be communicated to intermediate commanders.

276. The initiative of subordinates must not degenerate into independence.

Independence within proper limits is the foundation of great success in war.

277. If there is a prospect of contact with the enemy on the advance, the post of the commander is as far to the front as possible, and usually with the leading divisions of the advance guard.

The commander moves to the front with the utmost dispatch, taking care to keep in communication with his troops. He dismounts at places which afford a good view and reconnoiters with the field glass. He thus gains information at first hand concerning the conditions of the enemy, the neighboring troops, and the terrain, which can not be furnished by communications, reports, or maps. Thus he will be in a position to give his first instructions properly, to gain an advan-

tage over the enemy by his prompt dispositions, to avoid marching his own troops by circuitous routes, and to prevent faulty dispositions on the part of subordinate officers.

The commanders of the subordinate units with whom he has to deal directly should be called to the front as opportunity offers.

278. To direct the fight the commander-in-chief should place himself far enough to the front to be able to see his troops and to be easily found himself. A view of the ground to the front and of the enemy, as well as good communication with the next higher command and with his subordinates, is desirable for a commander situated on the advanced line. Change of place deranges permanent communication and must not be undertaken without cause.

If the commander leaves his place, care must be taken that orders and reports intended for him are directed to his new position.

279. Commanders at the front must dismount under effective hostile fire and seek cover so far as is compatible with the requirements of observation.

Even the higher commanders and their staffs who are situated farther to the rear must conceal themselves from the enemy and will do well to dismount.

280. Definite distribution of the staff, assignment of different duties to individual officers, and the continued observation of the enemy, especially from elevated positions, are necessary. The commander's flag must not betray the position of the commander to the enemy, although it must be visible to his own troops whenever possible. It is most suitably placed on the main road of advance. From this point reports are forwarded to the commander.

281. Information as to the position of the enemy and as to the nature of the ground is a preliminary condition to the decisions of the commander.

Often the more detailed knowledge necessary to carry through the combat is furnished only after it has begun.

282. For rapid communication between the higher commanders, the telephone may be of great importance. In general, direct communication between the various commanders or their staffs will be established. (For delivery of orders and reports, see Field Service Regulations.)

283. The attention of all commanders must be directed to the maintenance of order, cohesion, and cooperation. The higher commanders must see to it that their troops do not get out of hand. Subordinate chiefs must endeavor to rejoin their commands quickly after accomplishing any mission. If this be impossible for want of time they should join the nearest higher commander and offer their services and that of their troops to attain the common end.

284. Commanders must be so sure of their troops that they can devote their whole attention to the combat. They should transmit important information to each other.

285. Although at the beginning of a battle care should be exercised not to put too many men in line, on the other hand there is no greater error than to employ too few and to sacrifice them by dribblets. One would continually have to fight against a superior force, voluntarily foregoing the advantage of superiority in numbers.

Not only does an unsuccessful undertaking entail unnecessary losses, but it also injures the morale of the troops.

286. The difficulty of changing the front of the firing line increases with the size of the units engaged.

Before the beginning of the battle, the front on which the fighting is to be done must be determined as exactly as possible. If the advance shows that an error has been made, it is usually only possible, with large units, to develop new lines on the correct front.

287. Extension and arrangement of troops depend on the objective, the terrain, and on the troops acting in concert. They will be various, depending on whether a body of troops fights in conjunction with others or alone; whether they are to fight on the offensive or defensive or only to occupy the enemy for a definite time.

288. Apart from one's own strength and intention, the extension of the enemy's front also will have some bearing on the initial extension of front.

Where a large front in battle must be occupied by a small force, fighting must be carried on by more or less detached groups.

That ground will, then, be taken advantage of which affords cover in the direction of the attack.

289. If there is protection on both flanks, the available space in the direction of depth determines the formation. Troops retained in the rear are needed, in this case, only for carrying on the frontal attack.

290. Troops protected on one flank are, of course, less restricted in extending their front, but will have to make dispositions in the direction of depth to protect the unsupported flank. This can be accomplished by pushing forward the units in rear in echelon. Distance and interval increase with the strength of the echelon.

291. Troops fighting independently are least restricted in the extension of front and the formation in the direction of the depth. They must, however, under certain circumstances, protect both flanks to guard against being surrounded.

292. The artillery forms the skeleton of the battle. On its position the grouping of the remainder of the field forces will, in a great degree, depend. For that reason the commander must reserve for himself the choice of the artillery position and indicate to the artillery commander what cooperation he expects from him.

293. The commander most effectually insures his control over the activity of the units engaged on the firing line by assigning definite tasks to them.

294. The commander possesses, in the forces not yet used, the reserve, the chief power to influence the whole course of the fight. With it he can change the decisive point of the battle to a desired position, assist wherever he thinks it necessary to reenforce, and finally can decide the issue.

The reserve must not be too weak; the splitting up of the units must be avoided as much as possible. In large commands even a part of the artillery may be placed in the reserve.

295. The position of the reserve depends on circumstances and ground. It will usually be where the decisive action is anticipated or desired.

If at the beginning of the battle conditions are still so uncertain that it is better to retain the reserve in rear of the center, care must be taken that when moving up on the flank of the firing line, it is not unduly exposed to the enemy's fire.

296. If the commander sees that the battle will have a successful issue, he must take timely measures for the pursuit that is to follow it. Victory should find the commander in the front line.

297. If a retreat must be made, all commanders must ordinarily remain with their troops in order to maintain cohesion and order. After the commander in chief has given the preliminary instructions and assured himself of their execution, he alone will ordinarily ride to the rear in order to prepare further measures for the retreat (par. 432).

298. Night fighting increases the difficulties of leadership, particularly with large units. It requires thorough preparation and the employment of the simplest formations. Chance plays a far greater rôle here than by day, but the stricter the discipline the less is its influence (pars. 386-390, 415-416).

299. If for want of cover the rear lines can not be withdrawn from the enemy's fire, the distance between them must be such that the sheaf of infantry fire or the shrapnel cone shall not include two lines at the same time (generally 300 meters). If it becomes absolutely necessary that a detachment in the rear be immediately moved up to the firing line, this consideration becomes of secondary importance.

300. Volley fire which takes the enemy by surprise may have a very demoralizing effect. The closer the range the more demoralizing it is.

301. An effective means of increasing the fighting power of troops is to lay aside the pack.

As soon as it becomes doubtful whether the troops will be able to perform the task assigned them in battle without such relief, all commanders of detached units, and, when not detached, commanders of regiments and higher units, are justified in ordering the removal of the pack. They, of course, realize the loss caused by leaving the pack behind.

Ammunition and iron rations are to be taken from the knapsacks. Overcoats, cooking utensils, canteens, bread bags, and intrenching tools remain with the men.

302. When the conditions of the fight permit, troops rest with stacked arms.

303. For the replenishing of ammunition, see Field Service Regulations.

304. The most valuable quality in a commander is the love of responsibility. This must not be held to mean that a commander should seek to accomplish personal projects independent of general considerations; that he should fail to obey orders scrupulously or that he should wish to do better than to obey.

But in cases in which it becomes evident to the subordinate that the commander has not been able to see the actual conditions, or where it is evident that events have rendered previous orders nonsensical, it becomes his duty to change or to disregard the orders received and to notify his superior accordingly. He will assume full responsibility for the nonexecution of his order.

A commander who freely shoulders responsibility will not shrink from using troops without hesitation, even when the issue of the battle is doubtful.

All commanders must continually realize and impress upon their subordinates the fact that omission and neglect are greater faults than blunders in the choice of means.

UTILIZATION OF THE GROUND.

305. Timely reconnaissance is a necessary preliminary to taking advantage of the ground. This must be executed carefully, but must not be so detailed as to retard the battle unnecessarily and thus place the issue in jeopardy.

Observation by the enemy must be rendered difficult on the advance and during the preparatory movements by a proper use of cover.

306. The desirability of adapting movements to the character of the ground while under fire must not be allowed to check the advance or to cause certain units to hang back, so that the attack finally breaks down.

307. The terrain has an essential influence on formations. Open ground involves greater distances in order to lessen the loss. Close country permits decreasing the distances. The commander must not fail to profit by the advantage afforded by close country, since it will often become possible in such country to reinforce the firing line rapidly. Closed formations can be retained longer on ground favorable to cover.

308. Level ground is unfavorable for attack. The defense

seeks it in order to make use of the advantage of a good field of fire.

309. Even on difficult ground the order and cohesion of the units must not be lost.

Every opportunity which the ground offers to restore order to the units must be utilized.

USE OF FIELD WORKS.

310. Artificial cover, obstacles, sham constructions, and masks, erected at the proper time and place, may render important service to the commander of the troops.

311. If conditions prove other than expected, the works already finished must not influence the actions of the commander. On the other hand, the consideration of the fact that works might be built unnecessarily must not cause their construction to be omitted altogether.

312. Deep trenches afford the best protection. When time is wanting, one must be satisfied with less cover.

313. During the attack, intrenching tools may be advantageously used in positions where troops must hold fast to what has been gained. However, it must not be forgotten that time is more beneficial to the defense than to the attack. As it is difficult to again push forward a firing line which has intrenched itself with great labor under an effective fire, the intrenching tools must be used with care in the attack.

Never must the desire for cover check the attack, nor possibly end all thought of attack.

314. The infantry must be exercised in the building of field-works without the aid of pioneers. All officers must understand how to choose suitable positions and how to direct this work.

ADVANCE INTO ACTION.

315. As the enemy is approached, the preparations for the battle must be completed.

Marching up, (Aufmarsch) development, (Entfaltung) and deploying (Entwicklung) must now be considered.

"Marching up" is the passage from the column of march into a broader formation of units in close order. It is used to shorten the depth of march and assemble.

“Development” is the establishment of a broader front by the breaking up of the column of march into several columns. The troops radiate out and can generally retain the marching formation. “Marching up” in long columns is only employed when there is no prospect of an immediate encounter. “Development” gives a better formation of troops in depth for use in battle.

“Development” can also take place from the assembling formation. In case one can foresee the necessity for beginning an action the “marching up” will be avoided, since it will generally involve loss of time and strength, and the “development” chosen instead.

“Deploying” is the arrangement of troops for battle in firing lines. As a rule it follows the “development,” but it can also take place immediately from the marching column or from the assembling formation.

316. On halting, the depth of march is reduced, either by forming close columns of companies (tief Kolonne) for the “marching up,” or if “development” is about to take place, by placing several marching columns side by side.

317. On roads of sufficient width it may be useful to shorten the marching column at the outset by the formation of double marching columns. (See Field Service Regulations.)

318. Whenever possible, when infantry halt, it must leave the road. If arms are stacked on the road, they are placed on one side; as wide a space as possible is left clear. Light baggage will generally be kept on the road.

319. When marching off the road, timely reconnoitering and the assignment of roads to the columns are necessary.

320. When the artillery goes forward, it must be ordered on which side it is to pass the infantry, in order to avoid the crossing of columns. If crossing can not be avoided, the infantry forms a broader front in masses, when it is obliged to halt; it then hastens while the artillery is taking position to pass through the gaps of the artillery column.

321. The position of the troops which are held in reserve is determined by the direction of advance and by the necessity for keeping them concealed from the enemy’s fire, and even from his sight, if possible.

Large units are held in well-separated groups.

322. For moving assembled masses, a deep column or several deep columns may be employed.

323. Each assembly must be covered according to necessity.

CONDUCT OF THE ATTACK.

324. The attack consists in firing on the enemy until close range is reached, if this is necessary. Victory is made complete by charging with fixed bayonet.

325. Within the zone allotted a unit for the attack, level tracts devoid of cover must be avoided as much as possible, or only small and well-extended forces must be ordered to advance over them, while the main body must be placed so that approach under cover is possible.

If this proves impossible, the decisive attack must be led across the open ground.

326. Every attack begins with the deployment of skirmishers. As a rule, the skirmish lines approach as close as possible to the enemy before opening fire, in order to be able to begin the battle with an effective fire. The point to which the advance can be made without opening fire is determined by the nature of the ground, the effectiveness of the fire of the enemy, and, above all, by the character of the troops. It is expected that well-trained infantry will not open fire, even on ground devoid of cover, until the mid-ranges are reached.

327. The desire to press forward continually and endeavor to surpass each other must animate all the units of the attacking force. Where further advance is impossible, the ground gained must be held at all hazards.

Troops driven back form front again at the latest as soon as they reach cover. Reenforcements carry the wavering troops forward again with them.

328. Continued communication between the leading units of the attacking force and the commanders at the rear is necessary.

The use of the telephone for this purpose is particularly valuable.

When cover is available, reports and orders can, under certain circumstances, be carried by mounted men. In other cases communication must be carried on by signaling.

329. During the infantry attack the artillery must, while

sufficiently engaging the opposing artillery, endeavor to concentrate their fire with destructive effect upon that part of the enemy's infantry position which is to be stormed.

330. The advance of infantry while the artillery duel is still in progress compels the enemy to show his troops and to expose them to effective artillery fire (paragraph 444).

331. Accompanying the infantry attack by single batteries up to short ranges increases the morale of the infantry and may prevent a repulse.

332. If the ground permits skirmishers to advance under cover until they reach effective range, dense skirmish lines must be "deployed" there.

333. Very often the defense will have so selected his position that the attack will have to pass over broad tracts devoid of cover. If this is the case, it will seldom be possible to reconnoiter the enemy's position sufficiently to warrant the employment of large forces with any certainty.

334. Over such ground the enemy's fire may compel the attack to advance in loose, unconnected firing units, which offer difficult targets. When these units have reached a suitable position, they usually await reenforcements before opening fire. Up to this time the skirmishers seek to conceal themselves from the view of the enemy.

335. When from this first firing position a highly concentrated fire has been delivered, then the advance toward the enemy begins, with mutual fire support, until storming distance is reached. Methods can not be prescribed for individual cases, as the character of the ground and conditions vary so widely. The infantry combat exhibits varied formations and scenes at the different points of the battlefield.

336. If any unit has an opportunity to advance—be it squad, section, platoon, or company—it is its duty to utilize it. This is generally indicated by the gaining of a temporary superiority of fire, which is shown by the abatement of the enemy's fire or by his shots passing overhead.

Regularity in the advance of units should be avoided. The only thing to be kept in view in advancing is to avoid interfering with the fire of neighboring units.

337. The length of the rushes depends on the enemy's fire

and the nature of the soil and the configuration of the ground. Long rushes are desirable in order to approach the enemy as quickly as possible.

Generally small units must content themselves with short rushes, as otherwise they would hinder the fire of those left lying behind. Rushes in small groups, therefore, retard the advance and are only to be used where the conditions demand it.

Rushes by units larger than the platoon make mutual fire support difficult. They are only to be used when the superiority of fire is plainly evident.

338. By the use of cover, some units will be able to advance more rapidly than others. It would, however, be a mistake to detain them. They must consider, however, whether their isolation will not ultimately compel them to retreat, and thus jeopardize the success of the attack.

339. The aim must be to seize quickly positions which may serve as points for continuing the attack. From these positions the advance of the adjacent units may be aided by active fire.

In such positions entrenchments may be useful. A part of the skirmishers cover those at work by their fire.

340. In very hilly country an opportunity will frequently occur to support the advance of the firing lines by firing over them from elevated positions in rear.

341. For carrying through the attack the firing line must be maintained at its full strength by reenforcements. The timely bringing up of supports, as well as the replenishment of ammunition, must be the continual care of the commander.

The rear lines are kept back at the beginning in order that they may not suffer unnecessary losses. They must advance as soon as the conditions of the attack require it, and must be available for decisive action under all circumstances.

342. Breathing spells, division into small units, and the employment of extended order will often be necessary during the advance. It must be borne in mind that to give up close order is an evil which may often be avoided, especially when the firing line has approached close to the enemy and has sufficiently cut down his fire. Units in close order must not expose themselves to effective fire.

343. When the firing line has succeeded in approaching the enemy's position and in sufficiently shaking him, the charge is begun.^a

344. Whether the order to charge originates on the firing line or whether the command to do so is given from the rear, depends on circumstances.

345. If the front line is convinced that the opportune moment has arrived, it must not hesitate to risk the charge. Notification of this determination is sent back by signals.

The units in rear must immediately form and hasten forward by the shortest line without regard to losses.

346. If a part of the attacking forces, situated on a flank or on an elevated position, can deliver effective fire, while the charge is in progress, on the position to be taken, it continues to fire even during the assault.

347. If the determination to charge proceeds from the commanders in rear, notice of this is given by ordering the signal "fix bayonet," which must be executed by all the units which are to take part in the charge.

At this signal the skirmishers increase their fire to the utmost. The units of the firing line which are still behind, work themselves forward as quickly as possible. All reinforcements in the rear hasten to the front as rapidly as possible.

348. When the front line is to form for the charge, all the buglers continuously sound the call "quick forward," all the drums are beaten, and all the units throw themselves with the greatest determination upon the enemy. It is a point of honor with the skirmishers not to permit themselves to be caught up with by the supports until they are breaking into the position. When immediately in front of the enemy they charge bayonet, and with hurrahs dash into the position.

349. Though the charge is to be executed as a whole, yet it must not be understood that the enemy's position is entered simultaneously by all the units. The latter is of secondary importance, and an attempt to accomplish it might result in delaying units that had a successful prospect of carrying

^a At maneuvers the distance from the enemy before charging is about 150 meters, provided the character of the ground or the umpire does not require some other distance.

through the charge, because others were still in the rear. The power of the attack would thereby suffer. All units which have once started must continue to advance without stopping.

350. If the charge has been successful and the enemy overthrown, it is an error to push more rifles into the captured position than can be brought into action.

Units in the rear must be halted in time, in order to employ them for some other purpose. Their commanders must therefore often act on their own initiative.

351. Preconcerted plans for attack are prohibited.

RENCOUNTER.

352. Uncertainty and lack of information concerning the enemy is the normal condition in war. During the movements preliminary to an engagement the opponents will frequently receive detailed knowledge of each other only when they come into direct contact. Thus the combat is really developed from the columns on the march.

353. Since the advance guard may have to overcome unforeseen resistance or to hold positions against a superior force, the assignment of artillery to the advance guard will often recommend itself. The senior commander with the advance guard may, when necessary, hold back the artillery at some designated point in order not to expose it to defeat by superior artillery.

354. At the beginning of the battle that commander will have the advantage who is the more ready to fight, for he will thus preserve his freedom of action.

355. At this time information gained concerning the enemy and the country has the greatest influence on the choice of the time, manner, and place for the engagement. If contact takes place before sufficient information can be obtained the general situation must decide whether the attack is to be made. If attack is decided on, quick action is in order.

The commander must then make his decisions without awaiting further information. He can assume that the enemy is no better prepared than himself.

356. To the advance guard falls the task of securing for the main body time and space to develop for battle. The com-

mander in chief gives the commander of the advance guard the necessary orders on this subject.

It is particularly important that the position selected for the artillery be made secure. Important points on the front and flanks, especially the commanding positions, must be quickly seized, if need be, by fighting.

357. The advance guard must not hesitate to deploy on a front greater than that for which the same number of men would be required to fight a serious battle. The artillery hastening up will quickly bring it relief.

358. Although the nature of the encounter requires quick action, the commander can not give orders for the deployment of the main body and for the attack until the advance guard fight has cleared up the situation.

359. While as a rule the main body should be used as a whole, still, cases may occur in which the commander must throw into the battle without delay units of the main body as they arrive, in order to retain or make the best use of an advantage gained by the advance guard.

360. If the enemy has gained the advantage by being the better prepared for battle, it is necessary to delay the development. In order not to become outflanked at the outset and continually to fight against a superior number, the commander will avoid the main battle until he succeeds in developing sufficient troops.

It may even be advisable to cause the advance guard to fall back in order to save it from a destructive battle and in order to shorten the time to deploy.

361. It is desirable to begin the artillery battle approximately at the same time as the deployment of the infantry, in order that the enemy may remain in doubt as long as possible. This rule is to be disregarded, however, if the advance guard requires the support of the artillery in the performance of its task, or if an attempt is to be made to gain information respecting the enemy by means of artillery fire.

ATTACK ON AN ENEMY DEPLOYED FOR DEFENSE.

362. If the enemy resolves to act on the defensive, he practically gives up the advantage of freedom of action.

363. The assailant then has time to reconnoiter the enemy's position and to weigh all circumstances which favor the attack. He must not limit himself to reconnaissance by the cavalry and to observation through field glasses. Mounted officers and infantry officer's patrols, by a close approach to the enemy, must supplement and complete the information.

364. If the reconnaissance shows that an immediate attack promises no success, whether darkness can be utilized for getting up closer remains to be considered.

365. If the commander has gained an insight into the situation and thereupon decided upon the position his artillery is to occupy and what direction he will give his attack, he places his troops as close to the enemy's position as possible.

366. The approach to the preparatory position must take place under conditions of uncertainty. The unit leaders reconnoiter the roads of approach by riding ahead. As soon as the enemy's dispositions are known as well as possible the front for deployment is divided between the units and the strength of the reserve is determined.

367. The preparatory position should be without the zone of the enemy's effective fire and also concealed as much as possible from his sight. In country generally devoid of cover, even when the enemy's artillery will be neutralized by our own, the infantry must be put in the preparatory position at 3 kilometers or more from the enemy.

368. The artillery begins the battle as soon as it is ready for action. It thereby makes easier the advance of the infantry and assists in obtaining a clear knowledge of the situation of the enemy.

369. In order to coordinate the march of the units toward the preparatory position it is advisable to have them move from one depression to another, especially when the view is limited. It will thus be possible to avoid the premature arrival to within dangerous proximity to the enemy of units whose march has been favored by the character of the country, while others, who had farther to go or whose movement to the front was more difficult, are still a considerable distance to the rear. The commander must so arrange the disposition of the troops that no loss of time will ensue when they move up in this manner to the preparatory position.

370. Even when it is desirable that the whole line making the attack should open infantry fire as nearly simultaneously as possible, it is by no means necessary that all troops in the preparatory position should be at the same distance from the enemy. The units which have arrived nearest to the enemy's position on account of favorable country can then by their fire help those in rear to cross over exposed ground.

371. After the troops are in position, the commander gives the order for the attack. This order, in so far as this has not already been done in the instructions for the preparation, must indicate to the larger units the ground on which to deploy and the part of the enemy's position which each is to attack (assignment of fighting front). A unit may also be designated upon which the others are to regulate their movements, although they must not be fettered thereby in moving forward. (Guide of the battle.)

372. In proportioning the forces it must be borne in mind that one can scarcely be too strong for the attack. But the field of attack must not be overcrowded in such a way that after heavy losses have been made good, even considerable numbers can not find place for firing.

373. With regard to the space for deploying, it can be stated that the company on a war footing will occupy, while attacking, 150 meters at the most, and a brigade consisting of 6 battalions about 1,500 meters.^a

374. Although superiority of the artillery fire which prepares the infantry attack is to be striven for, still the carrying through of the infantry attack must not be made entirely dependent thereon. The paramount consideration is the situation as a whole.

ATTACK OF A FORTIFIED FIELD POSITION.

375. The attack of a position which is strengthened by all the resources of field fortification will frequently be possible only by night.

376. After the enemy's advanced troops have been, as far as possible, driven back to the main position, systematic reconnoitering and sketching of the enemy's position, and the selec-

^aAt exercises with units on a peace footing the front required for deploying these units on a war footing will be retained approximately.

tion of methods of approach of artillery positions, should be done by daylight.

377. The attacking batteries, protected by troops in advance, begin the artillery combat as early in the day as possible. Heavy artillery is particularly effective. In order to attain uniformity in the artillery fire it will be advantageous to place the whole artillery under a single artillery commander. With sufficient support from the artillery the infantry will be able to approach nearer the enemy's position by day, and perhaps even be able to undertake the assault. Otherwise it is generally expedient to advance infantry at night.

378. Night attacks require particularly thorough preparation. Above all, the roads of approach and the line to be reached must be selected and wherever possible must be indicated by features of the terrain, such as bushes, clearly visible strips of bare ground, etc. Each unit must be exactly instructed concerning its direction of march, and this must not be changed in advancing; the leader must impress upon his mind the position of certain definite objects which are perceptible, even at night, and must, if necessary, use the compass. Trustworthy guides, light-colored signals, bright distinctive marks, such as white flags, white bands around the arm for our own troops, lanterns shaded on the side toward the enemy, are used to prevent fatal errors. Generally loading should be prohibited.

379. Thus the advance can be noiselessly made in a compact firing line with the support close behind. Firing is to be avoided, and the effect of the enemy's fire (if he should use artificial illumination), is to be diminished by occasionally throwing one's self on the ground.

For restoring order, short halts will be made, if necessary.

380. There is an advantage in selecting the position from which to open fire so close to the enemy that from it the assault can be made.

The troops must intrench themselves quickly in the position, or in case the ground is hard, provide cover with sand bags carried with them, and must prepare everything for fire action. Machine guns will be particularly useful.

381. While constructing cover the workmen must be ready at all times to fight. To guard a prepared position by par-

ticular detachments pushed forward is not expedient. Security must be gained by patrols.

382. The pioneers must try to clear away by night obstacles to approach.

383. The artillery continues the fire during the night and increases it to its greatest intensity at daybreak. Under cover of darkness individual batteries are brought up into positions previously selected nearer the enemy and open an unexpected fire at dawn. They will endeavor to destroy obstacles and will support the attack as long as possible.

384. Beginning at daybreak, the fire of the infantry and machine guns, in unison with the artillery, must keep the enemy behind his cover, so that the removal of obstacles may be completed and the assault made, if need be, after a nearer approach to the enemy's position.

Reconnaissance must decide whether or not scaling ladders and similar implements must be carried.

385. When storming is attempted at early dawn from the storming position taken during the night, without previous fire action on the part of the infantry, the issue depends on surprise and rapidity of execution.

386. If sufficient information has been gained by reconnaissance concerning the enemy's position, the kind and condition of the obstacles, and the roads to be taken by the storming parties, the assault may then be made, even at night.

Whether the storming parties shall first be assembled in a particular position, or shall assault in combination with other units which under the cover of darkness have approached the enemy's position, depends on circumstances.

Feigned attacks against other parts of the position may divert the attention of the enemy from the main attack.

387. The greatest silence, unity of advance, observance of the proper direction of march, and maintenance of contact between individual units are indispensable up to the time for the assault. The hand-to-hand encounter will decide the battle.

388. There are no definite formations prescribed for the assault. As far as possible, simple formations are recommended since complicated ones tend to cause confusion. The rear lines follow at the shortest distance; the flanks are pro-

tected by troops in echelon. The reserve must be kept so far to the rear that it will not become involved in the night action unless the commander so wishes.

389. The night attack will cause great disorder among the attacking troops even if successful. To restore the units quickly and to steady them the commander should promptly bring up troops which are still in good order.

390. The captured position must be immediately prepared for defense. Every means for ascertaining the direction of the enemy's counter attack in time and for resolutely repulsing it must be taken.

Generally the pursuit will be begun only at daybreak.

391. Before attacking a fortified position, the knapsack is laid aside and the men well provided with ammunition and provisions, since it is possible that the attack may extend through several days.

THE FLANK ATTACK.

392. The combination of the frontal and flank attack furnishes the best assurance of success. A preliminary condition for flanking is to hold the enemy to his own front. For this purpose a determined frontal attack is most effectual.

It must be borne in mind that the frontal attack may lead to a repulse if the flank can not be attacked in time. Therefore, if a frontal attack can not be undertaken with sufficient strength, or if for other reasons it must be omitted, a skillful delaying combat, or even a mere threat of attacking may render the flank attack feasible.

393. Flanking is most readily effected by beginning the movement while still at a considerable distance from the enemy.

It will be more difficult to execute with success if it is begun at the same time that the troops are deployed or when it is attempted by the reserves kept in rear. Flanking by the troops in the front line is possible only on particularly favorable ground, and is then generally accomplished by an extension of the firing line by the flank.

In certain cases night can be utilized for such movements.

394. Since the flanking troops must advance at an angle with the main front, an interval must be maintained between

them from the start. This interval must be so great that the two inner flanks shall not overlap during the attack.

395. If the flanking troops have penetrated into the enemy's position, the greatest success is usually attained by rolling up the enemy's front.

396. Simultaneous flanking of both of the enemy's wings presupposes great superiority. Otherwise it will be detrimental to the attack because of the division of strength.

DEFENSE.

397. On its front infantry on the defensive is very strong when making good use of its firearms and requires relatively few men as compared to the attack. Its weakness lies on its flanks, unless these are secured by the nature of the ground or by other troops.

398. A pure defensive confines itself to maintaining the occupied position. A defense which desires not only to repulse an attack but also to bring about a decisive victory, must be prepared to act offensively.

399. The only position which is of value is one which compels the enemy to attack, which gains time for the defense by compelling flank attacks, or makes conditions favorable for offensive action on the part of the defense.

400. A position advantageous in all respects seldom exists; especially is this the case if it covers a large front. Suitable distribution of troops must compensate for the deficiencies.

The chief requirements are a free and broad field of fire, freedom of communication in and behind the position, and sure support for at least one flank.

401. The employment of artillery must be the consideration in the choice of the position. It must be able to concentrate its fire upon the probable direction of attack and to withstand the enemy's infantry attack until they reach close range.

The infantry position must be at a suitable distance in advance of that of the artillery. It is desirable to have this distance about 600 meters (paragraph 444).

A good field of fire for the infantry is also required up to close range. Where the nature of the ground does not permit of this, the frontal fire must be supplemented by flank fire.

402. The commander divides the position into sections, which are assigned to the various units.

The width of a section depends upon the nature of the ground. When the field is favorable for fire it can be increased. Few rifles but plenty of ammunition are then required.

This is not the case where, on account of a poor field of fire, it is possible for the enemy to approach to close range under cover. In the latter case the width of the sections must be small and must be strongly occupied. Each occupied section has its own reserve.

403. In order that all parts of the foreground may be observed and no portion of the enemy unexposed to fire, a division of the foreground corresponding to the sectional division must be made when necessary.

404. The method of preparing the position for defense depends upon the time available. The commander must make complete plans for his defensive works and assign to each unit its part in the labor. Generally, each unit prepares the defenses for its own section. The troops which are not assigned to sections are employed in the sections where important works are to be constructed.

405. At the same time that the defensive works are constructed of the field of fire is cleared and the ranges are determined. Provision for rapid communication must be made by the use of the telephone and by visual signaling.

406. Fieldworks lose a great deal of their value if they are so constructed that the enemy can easily discover their position by reconnaissance.

The enemy must be prevented from reconnoitering as long as possible. Often patrols sent out to the front suffice for this.

407. As a rule, but one defensive position is selected and this strengthened by all the means available.

Advanced positions may interfere with the fire of the main position and so frequently lead to partial defeats. Feigned positions may be prepared in advance of the main position when it is desirable to gain time. They are then to be occupied with but few men, who retire without fighting, if possible, after the enemy has deployed.

408. Defenses are not as a rule to be constructed in a continuous line, but in groups. Gaps between the individual groups are not detrimental, if the ground in front of them can be effectively swept by fire. When large units are employed, the use of the battalion group is the rule. Machine guns on the flanks of the groups may be of value.

409. The greater the number of men saved by means of suitable fortification and by skillful distribution of troops, the greater will be the number available for the main reserve. The prospect of a decisive victory will therefore be increased.

410. The main reserve must be kept ready in the most favorable position for meeting the enemy's probable attack and for taking advantage of the ground.

If fighting is not to take place on both flanks, the main reserve, as a rule, will be placed in echelon behind the protected flank. If both flanks are unprotected, the only course is to place behind one flank a reserve sufficiently strong to prevent the enemy turning it and behind the other the strongest force possible in order that it may be used at the decisive stage of the action.

The main reserve, in echelon, must have room for deploying, in order to prevent outflanking by the enemy or for use in counter attack.

411. Moving the troops into position too early discloses them prematurely; to do so too late may cause unnecessary losses. It is not always advisable to occupy the whole position at the same time.

412. Supports and section reserves must be ready at the proper time to repulse the enemy's attack. They are to be kept as near the firing line as the enemy's fire permits. If the ground does not afford protection, cover and covered roads of approach must be constructed.

413. If the defense has an ample supply of ammunition, it will open infantry fire even at long ranges if suitable targets offer themselves. If the advance of the enemy takes place over broad tracts devoid of cover, in loose, irregular skirmish formation, the defense will cover with volley fire the ground over which the opponent must pass. If the place where the enemy is forming his firing lines can be ascertained, the

defense directs his fire upon that point in order to overwhelm the enemy by superiority of fire.

It must always be borne in mind that an ample supply of ammunition is necessary during the entire fight.

414. The defense will only venture to make a counter attack in front of the position after an assault has been repulsed and full advantage has been taken of fire action, or to take an important position which the enemy has seized. A premature counter attack may lead to the loss of the position.

If the main reserve has been placed in echelon for the purpose of attacking the enemy's flank, it does so when the enemy's frontal attack is in full swing.

415. If the defense apprehends a night attack, preparations must be made while it is still daylight by determining the number of rifles required to sweep the field of probable attack and by the construction of necessary obstacles. If possible, artificial illumination should be provided for.

416. After dark every precaution must be taken to discover the enemy's approach and to provide against surprise. Reenforced patrols, illumination of the foreground from time to time, the utmost silence in order to hear every noise from the enemy will be the usual means taken. With the exception of the commanders, the observers, and a small force on the firing line, the troops in the position may rest. If the enemy's approach is perceived, the firing position will be rapidly occupied in force. Fire is not opened except at close range. The units in rear must be close at hand in order to drive out with the bayonet any of the enemy who may possibly have forced an entrance into the position.

DELAYING ACTION.

417. An action may be prolonged in order to gain time. Particularly is this the case in large units for the detachment opposing a turning movement. Similarly a delaying combat may be useful to engage the enemy until the attack of an adjacent column or flanking unit becomes effective.

418. In conducting a delaying combat the commander should employ strong artillery fire at long ranges. This is the best method of delaying the decision.

419. The infantry conducts the battle at long ranges with a widely extended firing line and holds far in rear the support and reserves. The line must be heavily reenforced and the troops in rear brought up only in case the battle assumes a purely defensive character, or the commander decides to make an attack.

420. Feigned engagements are employed to deceive the enemy concerning one's real intention. Such engagements may also be conducted offensively. The regulations do not prescribe particular rules for them nor for other still more unusual kinds of combat. The manner of conducting them will change according to circumstances.

PURSUIT.

421. Merely to overthrow the enemy is to achieve but half a victory. It must be completed by the pursuit the aim of which is the destruction of the enemy. Without vigorous pursuit, the beaten enemy will soon be prepared for renewed resistance which will have to be broken down by another fight.

422. The defeat of the enemy must be turned into complete rout by fire action and the most vigorous pursuit. If the retreating foe offers a good target, he must be fired upon. If he withdraws himself from fire, every endeavor must be made to close in upon him again in order to renew the attack with artillery and infantry fire or with the bayonet.

423. At the outset cavalry and infantry units on the flanks must take up the pursuit in a direction parallel to the retreating foe in order to reach the enemy's flank and rear.

424. Tireless pursuit calls for all the energies of the commanders. Even among victorious troops exhaustion becomes noticeable, and nature demands her dues from both high and low. Only the possessor of a strong will can overcome his own exhaustion and carry his subordinates along.

At such a time the commander must require almost impossibilities and must not be deterred from using rigorous measures even toward his own troops. Those who break down must be left behind. This sacrifice must no more lead to abating the pursuit, than losses in the previous fight would have caused giving up the purposes of the battle.

425. If the pursuit follows a successful attack, timely measures must be taken to secure what has been gained. The commander causes the troops who were most disorganized by the preceding combat to occupy the conquered position and reorganizes the units.

RETREAT, CESSATION OF THE COMBAT.

426. When the battle takes an unfavorable course, the commander must make up his mind in time whether he will retreat or continue the struggle.

427. The preparation for the retreat will be facilitated if the troops still retain their formation in the direction of depth. It would be an error, however, to keep a reserve to cover the retreat instead of employing it to assure the victory.

428. The method of conducting the retreat is determined by the condition of one's own troops and by the attitude of the victorious enemy. Beaten infantry can retreat only in a direction practically perpendicular to the front and in the formation in which it finds itself. It now needs all the assistance which the other arms can give it. To this end the artillery, while disregarding the hostile guns, must direct its fire upon the enemy's advancing infantry, even at the risk of the loss of its guns. The cavalry also, in order to enable the infantry to escape from the enemy, must sacrifice itself, even if the only result is a short gain of time.

429. Troops covering the retreat should occupy a defensible position, behind which the retreating forces may find time and space for reforming. It is most advantageous if they are sufficient for the purpose to employ only artillery and machine guns, protected by cavalry, while the infantry uninterruptedly continues its retreat. The mounted arms follow later at an accelerated pace.

A defensive position on the flank a short distance from the line of retreat is often advantageous.

430. During the course of the retreat it must be the endeavor to increase the distance of our firing line from that of the enemy. It is therefore wrong for individual units to become seriously engaged without cogent reasons, because it will then be difficult for them to break off the action.

431. As the distance from the enemy increases, it will become possible for the retreating troops to take up the marching formation and to throw out a rear guard.

The formation of several marching columns facilitates the retreat. Each column then supplies its own rear guard. Premature formation into a single column is to be avoided.

432. The commander in chief must conduct the retreat in accordance with a well-ordered plan. He must designate the position for defense and the troops to occupy it, and indicate to the individual columns their direction of march. Only after he has given these instructions and has made sure of their execution does he leave the battlefield in order that he may the better direct the progress of the retreat. The carrying out of the details is left to subordinate commanders (par. 297).

433. The cessation of the battle, whether it takes place by order of the commander or by direction of higher authority, is most easily accomplished after a success.

The more successfully such intention is veiled the sooner will it be possible to carry it out, and it becomes more difficult, the farther the action of the battle has advanced.

VILLAGE AND FOREST FIGHTING.

434. Whether a village shall be included in the line of defense or be used by the troops as a detached post depends on its position and character.

Strongly built and well-defended towns may become the foci of the battle. Still, care must be taken not to place too strong a force in a town.

435. The firing line will very often not coincide with the edge of the town. If time is available, defensive works are constructed. Fire from the upper stories of the houses may be useful.

436. If the enemy breaks into the town, every street and every inclosure must be defended.

The reserve must drive out with the bayonet the enemy who has forced his way into the town.

437. In the attack strong forces are sent along the sides of the village. The artillery preparation for storming a town must be thorough; a plunging fire is desirable.

438. If the outskirts of the town have been taken, the detachments who entered endeavor to follow close on the heels of the enemy and with the bayonet clear the way to the farther side of the town. In doing this they must keep off the streets and work their way through the gardens and yards. Small detachments are detailed to capture those premises which are still held by the enemy.

439. As soon as the other side of the town is reached preparations for defense must be begun.

Individual detachments desirous of pursuing the enemy must be prevented from going astray.

440. When fighting in the woods, particularly when they are extensive, it is difficult to maintain communication. Roads and fences facilitate the finding of one's way, and in thick woods offer units the only possible means of maintaining direction.

441. The defense must avoid deploying skirmishers as much as possible in the outskirts of the woods where they can be easily seen. In open woods the defense retires from the edge, but not so far that its fire is impeded by the trees. Skirmishers may be placed in advance of the front of the wood.

If the attack succeeds in forcing an entrance into the woods, the defense must endeavor to expel him by counter attacks, especially against the flanks. These attacks against the flanks are to be made with energy when fighting in the interior of the woods.

Large open spaces permit a stubborn defense, on successive lines of resistance.

442. The attack will turn his principal attention toward the salient points of the woods. If he succeeds in forcing an entrance, immediate restoration of order and formation is indispensable. Further advance takes place in compact skirmish lines not having too great a front, whose supports follow close in rear in close order and whose flanks are protected by reserves in echelon.

In woods not having great depth the attack is pushed through to the farther side.

ACTION IN COMBINATION WITH THE OTHER ARMS.

443. Infantry will seldom be so placed that it must carry on the combat alone. Generally it will fight in combination with the other arms.

444. In battle the activity of the infantry and of the artillery must be exercised conjointly.

The artillery protects the infantry at the beginning of the battle, which is then continued by both arms.

It is undesirable to have the infantry and artillery conduct the battle on the same line. The position of the infantry in battle must, as a rule, be so far in front of the artillery that the latter will be protected against the effective infantry fire of the enemy and that the infantry will not suffer losses from shots aimed at the artillery.

445. In order not to unnecessarily impede the fire of the artillery, the infantry when advancing passes around its flanks or utilizes the intervals generally available in the long lines of artillery. But if passing through the artillery line can not be avoided, at least all artillery fire should not be prevented at the same time but only that of certain parts of the line. Therefore it is advisable to hasten through in extended order or in column of squads. About 300 meters in front of the artillery, infantry does not impede its fire, even in flat country.

446. The infantry must accustom itself to being fired over by artillery. In an attack on an enemy's position the infantry should recognize that it is the duty of the artillery to direct its fire upon the points to be attacked until just before the charge.

Under unfavorable conditions for observation, the artillery fire upon the enemy's infantry will have to be discontinued when our front line has approached to within about 300 meters of the enemy.

The artillery then transfers its fire to the ground in rear of the enemy's firing line in order to impede the bringing up of the reserve.

447. Unbroken communication of the artillery with the firing line must be provided for. For this purpose the artillery usually sends officers to the front, who communicate

with it by signals. It is most important to ascertain how far our own firing lines are from the enemy, in order that the artillery may continue its fire as long as possible.

448. The infantry is obliged, without orders, to protect the artillery situated near it. The flanks and rear of artillery positions are most exposed to daring attacks by small detachments of the enemy. On ground affording good view the artillery protects its front by its own fire.

In long artillery lines only a few infantry are necessary to protect the front from possible molestation by hostile patrols. For this purpose small detachments at considerable intervals suffice.

449. In the combat against artillery attention must be paid to the fact that the superiority of fire of this weapon is at long ranges. Only at about 1,000 meters are conditions equalized, and at nearer ranges the infantry gains the superiority. Fire upon artillery is particularly profitable when it is going into battery, bringing up its advance train when it is moving, or when it offers a large target in any other manner, as is also a flanking fire on the cannoneers who are without flank protection and on the elements in rear. But never must infantry regard it as their task to replace artillery fire at long ranges or to vie with it. Such a tendency leads to waste of ammunition.

450. Changing the manner and direction of moving, as well as the employment of 'loose, irregular firing lines, makes it difficult for the enemy's artillery to get the range.

451. In fighting against cavalry, infantry, if prepared for fire action, must realize that it need not fear even a great superiority of numbers. For repulsing cavalry any formation is suitable which permits of the employment of effective fire. Firing lines against which a cavalry attack is directed suffer scarcely any losses worth mentioning. The enemy's cavalry will be satisfied, if it can cause the infantry to change its formation and delay its movements. Therefore only infantry detachments immediately threatened by cavalry should engage it.

452. Small forces of infantry may direct their fire upon dismounted cavalry with a prospect of being successful. Firing upon the led horses is particularly effective.

453. Machine guns, since they offer a difficult target and inflict losses upon the infantry even at long ranges, must be attacked at close ranges wherever possible. Narrow defiles, especially streets, which machine guns can sweep by their fire, must not be traversed by troops in close formations.

UNITS IN ACTION.

454. The smaller the unit the more seldom will it be placed in circumstances which require it to carry on an independent action; even the brigade will generally fight supported by other troops. Within prescribed limits, however, the independence of the individual unit down to and including the company is large.

455. Events will often render nonsensical orders coming from the rear. Timely action is frequently made possible only by the independent decisions of subordinate commanders. The chiefs of smaller units must bear in mind, however, that they are to perform their tasks in the combat in accordance with the plans of the commander in chief.

456. In battle uniformity of formation must not be insisted on. Each commander on his own responsibility chooses the most suitable formation.

COMPANY IN ACTION.

457. When preparing for the action the company commander rides ahead and selects the most suitable road for advance. This action supplements information concerning the country and the enemy.

458. When the company commander separates himself so far from his company that he can no longer personally command it, the senior officer present assumes command.

The company commander must return to his company as soon as it is evident that there is danger of considerable loss.

459. While taking advantage of the ground, that formation must be chosen which will allow the commander to keep his company in hand.

Column of squads is the most suitable marching formation. It must be recollected, however, that deploying from column

of squads requires more time than from some other formations. The company column with variable intervals permits the platoon commanders to take full advantage of the ground, and is especially applicable when it becomes necessary to deploy rapidly on an extensive front. Platoon, column and line formations best secure the cohesion of the troops and require little depth for concealing their dispositions.

460. The company in close order must secure itself on the battlefield by throwing out a weak skirmish line, on an exposed flank, if the flank be not guarded by separate detachments.

461. The number and manner of deploying the skirmishers depend on the available space and the purpose of the combat.

When attacking, compact firing lines must be deployed at the outset, if the firing position affords cover or can be reached by quickly passing over short distances.

If broad, fire-swept zones must be crossed before firing can be begun, if the conditions are not yet clear, or if a delaying combat is to be conducted, a deployment in loose skirmish lines must be adopted.

462. A company, entirely deployed at the outset, must be reenforced by men from other organizations to maintain its volume of fire. It is therefore committed to the undesirable mixing up of units from the beginning. However, the company commander must not hesitate to employ the full strength of the company at the very beginning, if conditions demand it.

463. In the attack a company supported on both sides will seldom be able to deploy more than $1\frac{1}{2}$ to 2 platoons at the same time on the space allotted to it. Reenforcement of the firing line will therefore usually take place by filling up of gaps.

464. A company supported on one flank only, and especially a company fighting alone, should avoid reenforcing by the above-mentioned method and thus prevent intermingling the platoons. The company acting alone must continually watch its flanks.

465. If firing lines are to occupy a defensive position, it is usual to first outline the position by means of the platoon and squad leaders. Timely occupation of a position is guaranteed by a few observers left in the position.

BATTALION IN ACTION.

466. Generally from the marching column, before going into action, a development, suitable to the nature of the ground, will be made. This, on account of its greater extent of front, prepares the way for deploying, and, in case of an unexpected encounter with the enemy, secures a better preparation for the battle.

467. If time is available, small stratagems may be resorted to, as, for example, in the extension of the companies on the main line, if by this means the enemy is prevented from observing the preparations.

468. Before going into action the battalion commander must communicate his orders to his company commanders, if possible, in the presence of all of them.

469. If the battalion is carrying on a decisive action within a larger unit, it is recommended to push forward several companies side by side at the same time in order to prevent, as far as possible, the mixing up of the companies.

If a battalion is acting alone, it is advisable to employ entire companies one after the other in order to have at disposal complete fighting units for further duties.

THE REGIMENT AND BRIGADE IN ACTION.

470. The regiment, on account of its history, its uniformity of training, the esprit de corps of its officers, and its division into three battalions—thereby simplifying subdivision—is eminently suited to the purposes of battle.

471. Seldom has the brigade, at the outset, the advantage of being divided into three parts. When separating a reserve from it, therefore, the breaking up of a unit can frequently not be avoided.

472. As a rule, when a regiment or brigade is deployed a definite task should be assigned to each subordinate unit. What was stated in paragraph 467 also applies here.

473. The larger the command, the more must the intermingling of units be avoided. The intermingling of parts of different regiments is particularly detrimental. It is therefore generally recommended to place regiments side by side.

Still the time, which the marching up and development of a brigade on a war footing requires (half an hour from the marching column), may have a decisive influence on the manner of its use.

FIGHT OF INFANTRY IN LARGER UNITS.

474. In an engagement the action of infantry should not become independent of the action of tactical units.

475. Unity of action is secured by the orders to the higher commanders, the sharp demarcation of the fields of action of the various commands, as well as by the combined action of adjacent tactical units. Undivided cooperation is, however, only possible when the subordinate officers never lose sight of the common purpose of the combat.

CONCLUDING REMARKS.

476. Simplicity of formations and the principles of the regulations must form the basis for thoroughness in training.

Careful observance of the principles of the regulations assures uniform training of the infantry of the whole army. Simplicity is a guaranty that the men called to the colors on mobilization will again accustom themselves to service in the shortest space of time.

477. The troops will be equal to all the tasks required in war if they have acquired a practical knowledge of the principles of the regulations.

Their training will have been good if they can do what war requires of them, and if, in battle, they are called upon to reject nothing that they have learned in peace.

Part III.—PARADE, ESCORT OF THE COLOR, HONORS.**1. THE PARADE.****IN GENERAL.**

478. Alignment and dress at parade formation and review are to the right. In parade formation all the files of a column cover.

479. If more than one company of a battalion is present at parade, the battalion commander takes command. If the companies are from different battalions, the senior battalion commander commands. In higher units special instructions are given by the commander.

Large bodies of troops and troops of different arms of the service are arranged one behind the other (echelon) according to necessity, and the conditions of command are specially regulated.

480. The commander of an independent division of troops acts in the same manner as a regimental commander.

481. Officers who are on parade or in command draw the sword.

482. All the other superior officers stand on the right (left) flank of their troops, according as the reviewing officer approaches from the right or left, but do not draw sword. They accompany the reviewing officer along the front of their troops on his outer side and are arranged according to seniority.

At the first march past they accompany, without staff, the troops, one pace to the right and on the side of the line of march, the senior being on a line with the front rank of the band, the others following according to rank. They salute by touching the headdress with the hand, and place themselves on the right of the reviewing officer, passing in rear of him.

The commander of a division accompanies the troops under him on the march past if they are assigned to lines not commanded by him.

483. Adjutants and staff officers of higher commanders present at the parade (from brigade commander upward) stand behind their commanders. If the front is ridden from

the right, they follow their commanders. (Exception, paragraph 502.) If from the left they remain at the right.

484. Spectators stand at the right wing, to the right and alongside of the immediate commanders. They form several ranks according to rank and number, and may close on the suite of the reviewing officer. (Exception, paragraph 502.)

485. If the reviewing officer is on foot, all mounted officers must dismount in the parade formation and on the march past.

486. In parade formation the following intervals are taken:

	Paces.
For a battalion	20
For a regiment	40
For a brigade.....	50
For a division	60
For an army corps.....	90

If space is lacking the intervals may be lessened; provided, however, that the commanders and bands are allowed sufficient room.

487. As soon as the reviewing officer approaches, the commander gives the command for all to present arms. He then goes to the right, or if the superior approaches from the left, to the left wing, and reports. If the commander is mounted he lets his sword hang from the sword knot around his right wrist.

While riding along the front he accompanies the reviewing officer on the outer side with sword lowered, places himself, according to his rank, among the commanders mentioned in paragraph 482, then goes in front of the troops and gives the signal to cease playing.

488. The reviewing officer causes the line of march to be marked by two adjutants (guide officers).

489. The commander salutes, in passing, when opposite the first guide (officer). In like manner all the generals, staff officers, and company commanders present at the parade salute, the latter, however, only when in front of their organizations.

490. When marching past, the commander continues straight ahead—at a walk—up to the second guide (officer), then, with lowered sword, turns out to the right—at a gallop when mounted—and places himself to the right and somewhat to

the rear of the reviewing officer. Here he remains, with sword lowered, until all have marched by. (Plate X.)

Similarly, all officers exercising command at the parade, from regimental commander (commander of independent unit) upward, turn out to the right. They take their places to the right of the reviewing officer, closing in according to rank. (Exception, paragraph 502.)

The staff officers of the commanders leaving the column continue straight ahead until beyond the second guide (officer).

The platoon commanders on the right wing (color bearers or right guides) are directed on the guides (officers). They take exactly the direction designated by the guides.

The platoon (company) situated alongside the color (colors) must move one file (two files) to the left at review.

491. At review the distance between units is, without regard to the number of files, as follows:

	Paces.
Between the platoons and companies	22
Between the battalions	40
Between the regiments	80
Between the columns of regiments	100
Between the brigades	100
Between the divisions	120
Between the army corps	150

The rear battalions (at review in regimental column, the regiments) move up, in mass formation, to the starting point, at the command of their leader. (Plate X.)

492. Colors and standards, as well as officers belonging to the noble Order of the Black Eagle, when marching past or accompanying the review, are saluted by the officers at the reviewing point and by the guides, by touching the headdress with the hand.

PARADE FORMATION.

[Plate VIII.]

493. The company is in line, with its platoons numbered from the right flank.

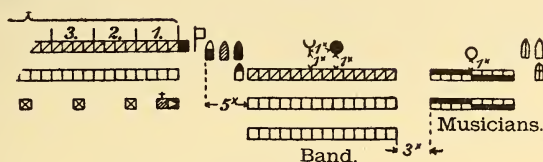
494. The battalion is in line of companies according to Plate VII, unless a different formation is ordered. Supernumerary staff officers and the adjutant remain on the right flank even when the commander goes to the left flank at **Eyes left.** The company commanders, the adjutant, and the musicians take their places at **Form for parade.**

PLATE VIII.

First Company.

First Platoon.

Parade formation.



NOTES.

1. If the company is alone on parade the battalion staff is to the right and alongside of the musicians.

2. At parade formation the colors are on the right flank of the leading platoon in platoon column and column of companies, and at the middle of the battalion in line of companies.

3. If the band is absent, there is an interval of 5 paces between the musicians and the right wing.

○ Regimental commander.

○ Lieutenant-colonel with staff.

○ Battalion commander.

○ Supernumerary staff officers.

○ Company commander.

○ Regimental adjutant.

○ Battalion adjutant.

■ First lieutenant or second lieutenant.

Y Bell-tree bearer (Schellenbaumträger).

● Bandmaster.

○ Battalion drummer.

⊕ First sergeant.

⊗ File closer.

□ Right guide (N. C. O.).

□ Left guide (N. C. O.).

□ Color bearer.

⊗ Man in the front rank.

□ Man in the rear rank.

■ Bugler.

■ Drummer.

495. The battalions of the regiment stand alongside of one another in line of companies or column of companies, the platoons and companies in the latter case having 5 paces distance between them. If "eyes left" is given, only the regimental commander goes to the left flank.

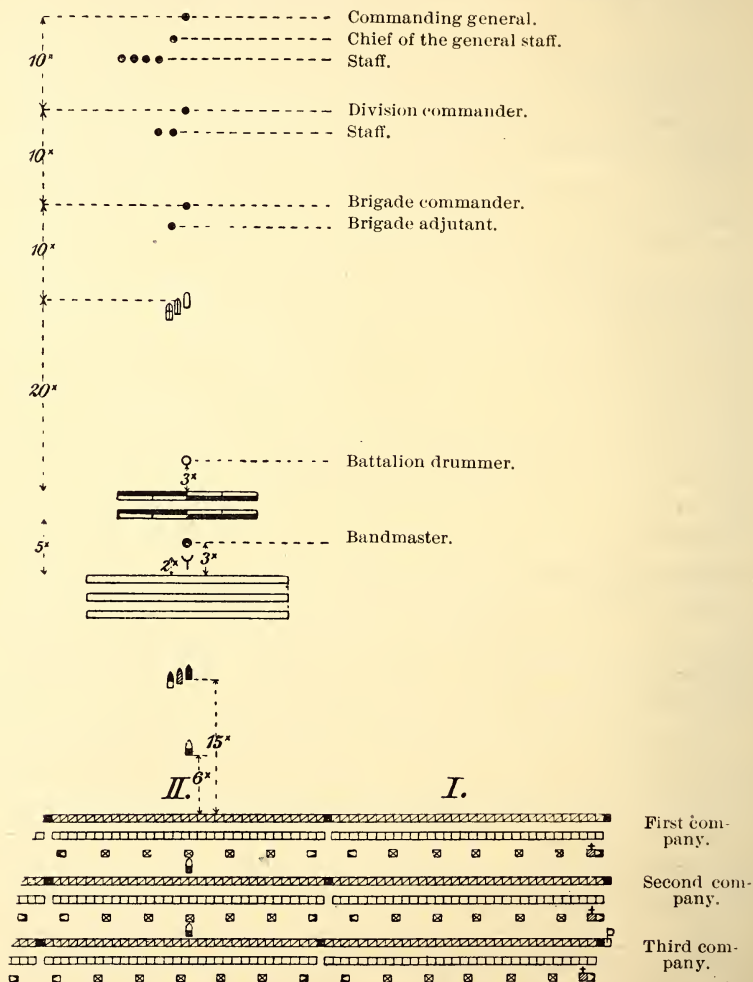
When the reviewing officer has passed one battalion and arrived at the head of the next, the commander of the first battalion rides in front of his command and gives the signal to his musicians (the band) to cease playing. He then brings the battalion to the "shoulder arms" and moves it up to the place provided for the review.

496. The regiments of the brigade stand alongside of one another, with their battalions in line of companies or in column of companies. As soon as the reviewing officer has arrived at the right (left) flank of the parade formation, the commanders of the remaining regiments cause them to come to shoulder arms. When the reviewing officer approaches, they cause the present arms to be given the second time.

THE MARCH PAST.

497. The march past is executed in platoons, company front, platoon columns, and with a regiment or brigade, also in regimental column. The battalion commander gives the com-

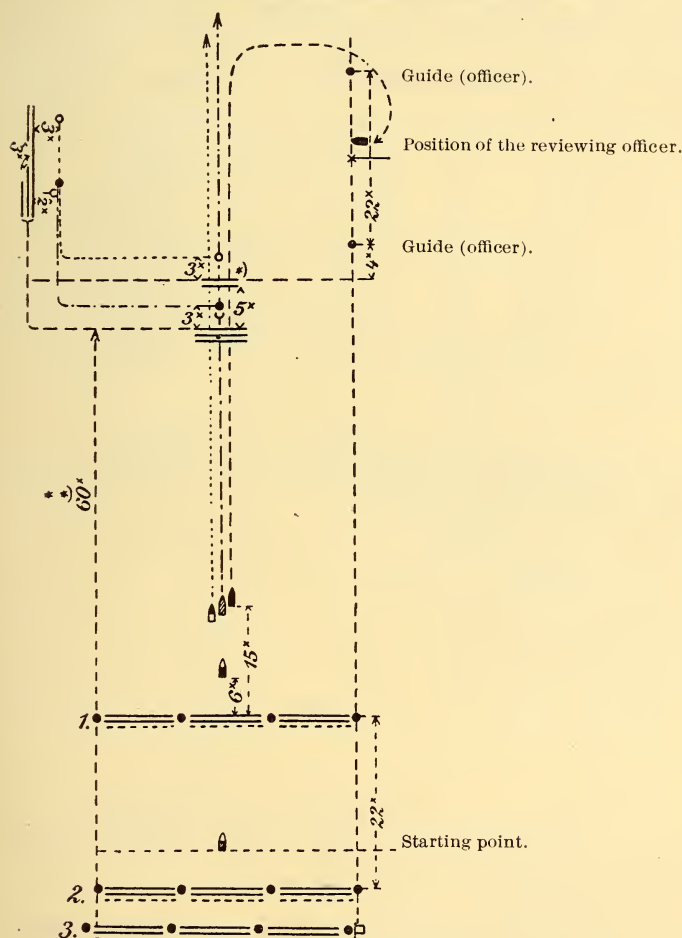
PLATE IX.—*Formation for march past in company front.*



mand for marching past (when but one company is present, the company commander), and the regimental commander for the march past in regimental column.

498. At March past in platoons (company front, platoon columns, regimental column), the places indicated in plates 9, 11, and 12 are taken. For march past in platoons, the company commanders go 6 paces in front of the center of the leading

PLATE X.—*March past in company front.*



* At reviews in regiments the musicians of each battalion form one rank.

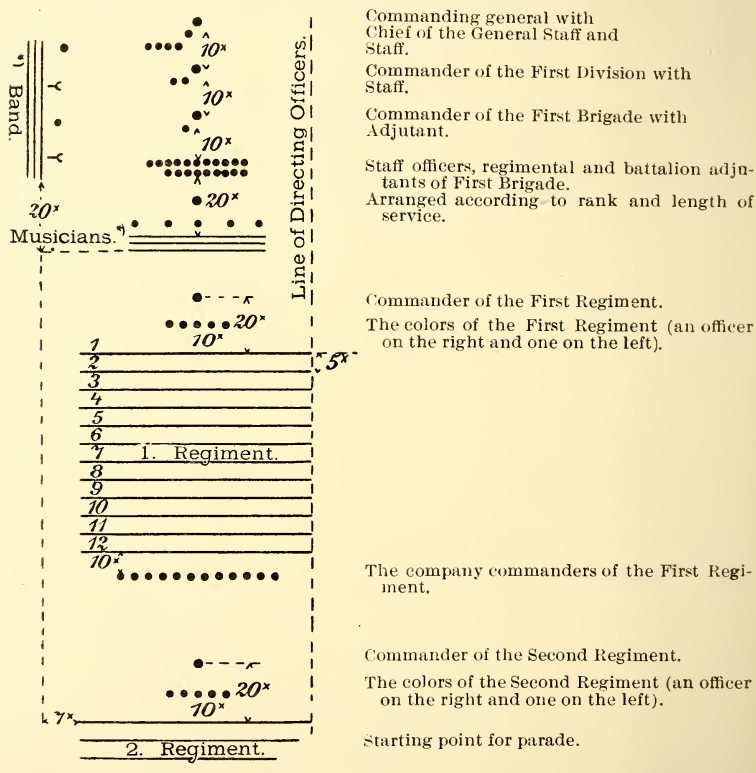
** With a larger number of files the distance may be greater than 60 #.

platoon of their company, the platoon commanders 2 paces in front of the center of their platoons, the left guide (officer) 1 pace in rear of the center of the file closers of the rear platoon.

For march past in platoon columns, the company commanders and the left guide (officer) take the same places, the platoon commanders remaining on their flanks.

At **Mark time**, company (battalion, regiment)-----**March**, the musicians and band step off, the company marks time until a distance of 60 paces has intervened (with regimental column 100 paces). The platoon commander (company, regimental commander) then commands, **Forward**-----**March**. (Plate X.)

PLATE XI.—Formation for march past in regimental column.



* For position of the musicians and band see Plate XII.

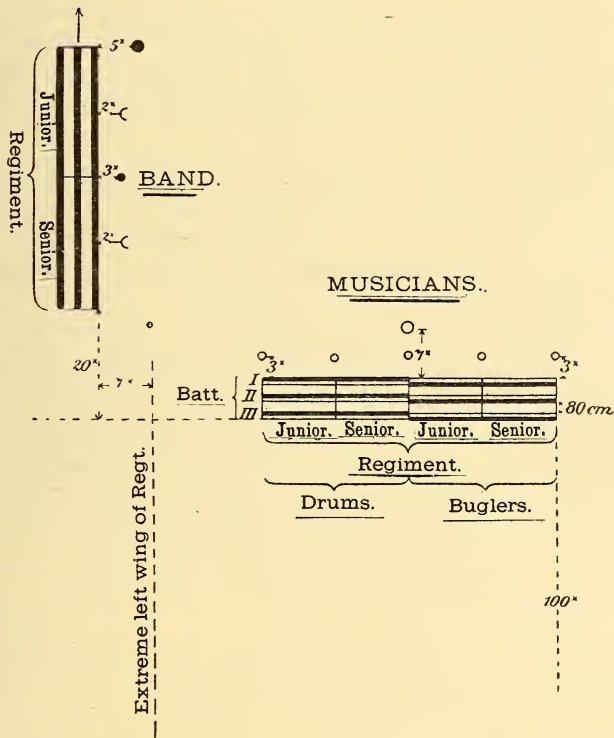
499. March past in regimental column. (Plates XI and XII.)

The distance between the musicians of the first brigade and the leading regiment and between the individual regiments of the brigade is 100 paces. The musicians of the second brigade follow in rear of the last regiment of the preceding brigade at a similar distance.

500. An independent battalion marches in the same formation and with the same distances as a regiment.

501. On marching past the troops look directly at the reviewing officer, except the officer, guides, the color bearers, and the noncommissioned officers who look straight ahead.

PLATE XII.—Position of the musicians and band for march past in regimental column.



INSTRUCTIONS FOR PARADES IN THE PRESENCE OF HIS MAJESTY.

502. The bayonet is fixed. Only such officers are permitted to stand in front of the troops as belong to the infantry or are ordered by the Emperor for service with these troops. Only noncommissioned officers and reenlisted soldiers are in the line of file closers, who are to be distributed equally. Honors are executed first by all the troops and then by brigades. At the first salute three cheers are given. If the

review takes place on the occasion of an imperial maneuver, each band passes from the "present march" to the national hymn as soon as His Majesty has reached the band of a command.

While riding along the front, only officers of the grade of brigade commander and upward, and foreign officers among the spectators, may follow the suite.

The regimental commanders (commanders of independent units), after marching out of column, place themselves on the left side of His Majesty and give, without being asked for them, the names of all the officers, down to and including the company commanders.

If the honorary commander of a regiment, etc., or a supernumerary officer attached to a command by way of compliment, takes part in the review, he stands—without adjutants—with sword drawn, to the right (left) of and alongside the commander.

At review the honorary commander is in front of the supernumerary officer and the latter in front of the commander. They leave the column in the same order.

If the supernumerary officer is junior to the commander in length of service, he stands to the left and rear of him at parade formation, and at review rides one-half the length of a horse in rear and to the left of the commander.

In doubtful cases the commanding general obtains the decision of the Emperor.

If a change in the intended direction of the march past becomes necessary, on account of the direction of the wind, consent must be requested from His Majesty.

2. ESCORT OF THE COLOR.

503. The colors are received by a company, with the musicians of the battalion and the regimental band, when this is present. The junior officer of the company, the color bearers, and a noncommissioned officer for each color enter the building in which the colors are kept and await the company.

The company marches up to in front of the building, the right squad opposite the entrance, if room permits. The march may be executed thus: **Squads right.** The musicians and

the band execute squads right. **On right into line March, Halt.** The first squad wheels, then marches straight ahead, and at **Halt**, comes to the halt. The rest of the squads march about the width of a squad beyond the turning point of the preceding squad, wheel of their own accord, and then march straight ahead until on a line with the preceding squads. The men take up alignment and dress, and then look straight to the front.

As soon as the company is halted, the colors are brought out, the officer being in front of and the noncommissioned officers in rear of them. The company commander presents arms. The colors are brought in front of the right wing, the officer stepping to the left, and a second officer, the next junior, to the right of them. The accompanying noncommissioned officers take their places in the company, going around the right flank. The company now marches off. For this purpose the command, **Break from the right, right squad, squads left**, may be given. Musicians and band, without playing, march by breaking from the right in front of the company and halt in such a manner that they are past the right squad of the company. At **Company March**, the musicians step off while beginning to play, the band, colors, and squads joining from the right flank. The colors, four to a rank, with both the accompanying officers, remain in front of the right squad and in rear of the band while marching. The company follows. The company commander alone rides in front of the colors.^a

The color company renders honors only in presence of His Majesty. The colors are drooped for the purpose.

504. When the company approaches the building when returning the colors, the drums beat to the color.

As soon as the company halts, the colors move in front of the right flank. The company presents arms. At **Attention**, the accompanying noncommissioned officers step behind, and the junior officer in front, of the colors. The officer next to the junior takes his place in the company. Immediately after the present, the junior officer, who, as well as the color bearers and the color guard, does not execute the present,

^a These instructions also apply in marching past with escorts of honor.

commands **Colors**-----**March**, and brings the colors into the building. Then the signal is given to cease playing. The company marches off without waiting for the officer, color bearers, and the accompanying noncommissioned officers.

505. If there are several commands assembled on parade their colors are received and returned by one company. When the color company has arrived at the parade ground the company commander causes it to halt and commands **Colors, Posts**. The colors march to the battalions, accompanied by an officer and noncommissioned officers. The present is not given by the troops when the colors arrive.

If the troops are formed directly in front of the building in which the colors are, the detailing of a particular color company is omitted. The officers and the colors with the noncommissioned officers come out of the house at the designated time and take their places by the shortest way. The troops present arms.

506. For receiving and returning the colors one officer with a squad, exclusive of the color bearers and color guards, suffices if (a) a long march is imminent or has taken place; (b), the color company would have to take a long circuitous route; (c), the colors are to be taken from the residence of one superior to that of another. The escort of the colors to and from the residence of His Majesty or of foreign rulers is always performed, even in these cases, by a company.

3. SALUTES.^a

507. Salutes paid by individuals without arms, consist in facing to the front, touching the head dress with the right hand, assuming an erect position, and standing facing the superior.

Noncommissioned officers with officers' side arms unhook the sword and carry it vertically in the left hand. The superior must be looked at when saluted. If necessary, room must be made for him.

Salutes are executed smartly. They begin 6 paces in front of and terminate 3 paces in rear of the superior.

^a Garrison regulations.

Facing to the front. If the man meets a superior, he executes a half turn toward him during the last step before the halt, placing the heels together, and assumes the position of the soldier. He keeps his head turned toward the superior, and follows him with his eyes while turning his head. If the man crosses a superior's path, he remains standing at a suitable distance, facing toward him. If the superior waives the facing to the front by beckoning, or desires a premature ending of the salute, the man goes on and salutes by touching his cap with the right hand.

When touching the headdress with the right hand, the man walks with an easy step, and 6 paces in front of the superior raises the right hand smartly, fingers joined; index and middle fingers touching the lower edge of the headdress so that they are at about the outer angle of the right eye and so that he can see past the hand. The right elbow is raised to about the height of the shoulder. The left arm is kept still. When ending the salute, the man directs his head straight to the front, at the same time dropping the right hand smartly. When passing by at attention, the arms are not moved. When at a halt, the individual faces toward the superior to be saluted.

508. The salute by the individual armed with the piece, and at a halt, consists in assuming the "order arms" or, if the piece is slung, retaining it in that position. If in march the salute is rendered by assuming the "shoulder arms" or, if the piece is slung, by retaining it in that position. When at a halt, the individual faces toward the superior. When passing by at "shoulder arms" the right arm is moved. When passing by with the piece slung, both arms are kept still.

509. Salutes by units in close order are executed at the command of their leaders. When at a halt: **Attention** is given. The men look at the superior. If necessary, the command **Eyes.....Right (Eyes.....Left)** must be given. If the superior walks or rides along the front of the command, the men follow him with their heads until he is opposite the third man, and then of their own accord, direct their heads straight

to the front. When marching: **Attention, Eyes.....Right (Eyes.....Left)**, **At ease** is given. At **Attention**, the drill march is taken up. When marching without arms or with pieces slung, the arms are not moved. At **At ease**, the men direct their heads straight to the front and continue the march at attention (see paragraphs 18 and 21). The leaders of detachments below the strength of a platoon, march alongside the man on the flank while saluting, and the commanders of platoons and upward, in front of their units.

APPENDIX.

MUSICIANS AND BAND.

MANNER IN WHICH INSTRUMENTS ARE CARRIED BY THE MUSICIANS.

510. The bugle is carried in a horizontal position by its cord over the right shoulder beneath the shoulder strap, the mouthpiece 2 cm. below the waist belt, pointing toward the front. It is supported by a device fastened to the waist belt by means of loops.

If the bugler is carrying a pack, the bugle is slung over the right shoulder after the knapsack has been fastened. In battle the bugle is carried in the hand or hanging in front of the breast.

511. The fife is carried in the right hand, mouthpiece down, and, if not used, it is in the case. This hangs at the left side of the waist belt, 5 cm. behind the side arms, the spring pointing toward the front. To use the fife, it is brought to the mouth with the right hand at the signal of the battalion drum major and at the same time grasped with the left hand. The second, third, and fourth fingers of the left hand must immediately cover the three upper keyholes, the right hand quickly following, the fingers taking the correct position.

After the fifeing is ended both arms are brought down smartly at the same time at the step following the last note.

512. At the "order arms" the drum is so secured that the catch engages in the holes of the hoop. The drum rests over the left leg, the snare head pointing outward and the left hand resting on the support. The lower edge of the batter head rests firmly against the left leg. When marching in step, the drum is so tilted with the left hand that it does not impede the left leg in marching.

The drumsticks are carried in the right hand, which hangs naturally, and are so held that the stick for the right hand points head down, while that for the left points handle down.

The shoulder arms. At **Shoulder**, the left hand takes hold to the right and alongside of the support. At **Arms**, the drum is turned with a short movement, batter head pointing up. The knee guard rests on the left thigh; both hands are immediately placed over the drum, the left hand grasping the stick at the handle. Both sticks are crossed on the center of the batter head, so that the head of the right stick lies immediately over that of the left. The left hand rests on the hoop.

Order arms. At **Order**, the sticks are placed together in the right hand so that the left stick is held close to the batter head. The right arm returns to the extended position at the side; at the same time the left hand grasps the hoop of the snare head to the left of the knee guard. At **Arms**, the drum is raised from the thigh with the left hand and turned so that the hoop of the batter head rests against the leg, snare head pointing outward. The left hand returns to the support. When marching in step, the drum is carried as at "order arms." Only when it is to be beaten is it carried as at "shoulder arms." For short marches it is carried in either hand without unfastening the sling at the support. On longer marches the sling is unhooked, hooked into one of the screws, and laid over the shoulder.

MANIPULATION OF THE BATON.

513. At "order arms" the right hand grasps the stock beneath the ball with the entire hand, little finger on top. The right elbow is somewhat raised.

The staff rests with the point directly against the right of the left toe and is somewhat inclined to the right and front, left arm by the side.

At "shoulder arms" the right hand is about 10 cm. in front of the buckle of the waist belt, the right elbow somewhat raised. The staff is inclined a little to the right, point upward. At present arms and at reviews the left hand rests upon the hip, the first joint of the thumb being fixed in the waist belt.

At **Attention**, the baton is quickly raised laterally to the

right, and at **Shoulder**, while giving the signal, brought down smartly until in front of the belt buckle.

If His Majesty rides past, no movements are made with the baton.

In the march past the right arm is kept still, moved freely.

To signify that the march is to be begun, the right arm is raised high laterally, the baton in prolongation of the arm, at **Company**, etc. At **March**, the signal is given by lowering the baton.

For giving the signal to begin or cease playing, the baton is raised high, the left foot is planted, and lowered at the fifth step following.

If in the march past the musicians are to execute left turn after the "prelude"^a has ended, the baton is extended horizontally to the left. The baton is brought back in front of the belt buckle, point upward, at the fifth step following the completion of the turn.

The battalion drum major gives the signal for change of direction by turning the baton in a circle with the arm pressed toward the body and wrist loose.

For halting and turning, the baton is raised as for the "prelude," and lowered at the fifth step following. At the seventh step the battalion drum major again raises it and gives the signal for "right turn" at the eleventh step. He beats time for the music, while raising and lowering the baton smartly about a handbreadth. In no other case must the time be given.

For the musicians (and the band) to step off, the battalion drum major, after the march past, raises the baton as for the "prelude" as soon as the rear detachment has passed him (the bandmaster raises his baton as for starting in the march past). Both give the signal at the same time for stepping off at the fifth step. The same signals are given for turning, marching straight ahead, and for cessation of playing.

FORMATION AND DUTIES OF MUSICIANS AND BAND.

514. Formation and duties, paragraphs 141, 221. (Plates I and XII.)

^a Locken—"prelude," played by the drums and fifes immediately before the band begins.—Tr.

The buglers take up the signals only at the order of an officer. See Field Service Regulations. When charging, the drums beat the charge without orders when the piece is brought to the charge, but the double time as soon as the command **March, march**, is given.

515. At **Attention; Present**.....arms the musicians proceed as in Supplement II.

The battalion drum major gives the signal for beginning and ending the marches.

The band plays a march from Collection I of the military marches (slow marches for the infantry), unless a special ceremonial march has been conferred on the command.

The playing of the marches is continued, even when cheers are given at parades in presence of His Majesty.

516. At the march past (par. 498) the drums begin to beat the military march (Supplement II, 5) at **March**, and when 20 paces before reaching the first guide pass over to the "prelude" (Supplement II, 9). After the "prelude" the band begins a march from Collection II of the military marches (quick marches for the infantry) unless special ceremonial marches have been conferred on the command.

Specially conferred marches may not be played by any other commands who may be present at the parade with those having this privilege.

At the signal from the battalion drum major and the bandmaster, given simultaneously with the ending of the "prelude," the musicians and band execute left turn and march 7 paces past the left flank of the troops. The musicians here turn to the right, the band following them.

Directly after turning on the moveable pivot the musicians at the planting of the left foot direct their heads to the right by files; up to that time they have directed their eyes upon their leaders.

The battalion drum major and the bandmaster, during the turning, mark time for a few steps; turn in a small circle to the right, and place themselves 3 paces to the side and in front of the left flank.

Musicians and band halt at the signal from their leaders, execute right face, and direct their heads straight to the front. At the same time the battalion drum major and the bandmaster

execute about face, march until in front of the center of the musicians and band, and face toward the reviewing officer. There is an interval of 3 paces between the musicians and band opposite the reviewing officer. After halting, the drums fill this interval. They march, at the signal for turning, 3 paces farther ahead, execute by the right flank at the third step, mark time 1 step, and with 3 steps move up into the first rank.

During this movement and the march past of the battalion, the drummers accompany the band with the march No. 6 in Supplement II. This march begins after the "prelude" has ended and left face has been executed. After the last detachment has marched past, the musicians and band step off at the signal from the battalion drum major and the bandmaster, turn to the left, and follow the battalion. At the second guide the music ceases.

If there is no band with the battalion, the musicians, after the "prelude" is ended, again play the military march during the march past.

The musicians of the regiment (brigade) are consolidated only at reviews. The regimental drum major leads them and places himself 5 paces in front of the right flank of the drummers. (Plate XII.) Bandsmen do not move their arms when approaching and leaving the reviewing point.

517. At the march past in larger commands the musicians at the head of the column mark time until the higher commanders are on the march. The musicians and band of the leading regiment march out toward the left. The musicians remain standing during the march past of the dismounted troops of their division and play through the "prelude" at the arrival of each new regiment or independent battalion. The drummers of the regiment coming up join at the fifth step and play the rest of the "prelude." Then, with the exception of the right guide, they turn their heads to the right and march past. The buglers do not move their arms before and after the "prelude."

The "prelude" must begin at 13 paces before reaching the first guide officer. As soon as its unit has passed, the band, at the signal from the bandmaster, marches straight to the front, still playing, until behind the center of the troops. Here it

turns to the left and follows the troops. At the same time that the regimental drum major gives the signal for the "finale" the bandmaster gives the signal for the band to cease playing.

The band of the command following takes the place just vacated.

If the newly arriving command has no band, the one belonging to the troops just passed remains and plays for the march past of the newly arriving troops and then turns and follows. After the last dismounted troops of the division have marched by, the musicians follow the band.

518. For the march past in regimental column the bands of the brigades, marching by the left flank, arrive at their places under the guidance of the senior bandmaster. Even at the march past the bandmaster leading the bands retains his place 5 paces in front of the left flank of the bands. (Plates XI and XII.) The drummers assemble at the left wing and are arranged as follows from right to left, viz, snare drums, cymbals, and base drums. The drummers of the first brigade beat march No. 7, Supplement II, and conclude it at the signal from the senior drum major, which begins as he plants the right foot 8 paces before the reviewing officer. Immediately on planting the left foot the bands begin to play a military march at the signal from the senior bandmaster.

The other bandmasters also beat time.

The musicians march straight to the front, their eyes directed on the regimental drum major. He raises the baton after he has passed 7 paces beyond the player of the bass drum, and at the fourth step thereafter gives the signal to turn to the left. The drummers place themselves, while turning to the right at the beginning, at a distance of 5 paces to the left and alongside of the band and accompany it with No. 8 march, Supplement II. The buglers follow the drummers, march along behind them, and also station themselves on the left flank. The battalion drum major, who marches on the left flank of the buglers, gives the signal for turning and halting.

At the approach of the second brigade, the drummers of the first are signaled to cease playing and pass to the "prelude," while the drummers of the second brigade begin playing at the fifth step. (Supplement II, 9.)

The bands of the first brigade, as soon as those of the second have arrived at 10 paces from their right flank, move back 9 steps in time while playing, at the signal of the leading bandmaster.

The bands of the second brigade march into the position of the first, come to a halt at the signal from the leading bandmaster, execute a right face at the fifth pace, and at the same time prepare their instruments for playing.

While the leading regimental drum major gives the signal for the "prelude," the leading bandmaster of the first brigade gives the signal for the band to cease playing.

The band immediately executes left face and marches at the fifth step thereafter, heads directed to the right.

After the "prelude" the bands of the second brigade begin playing and are accompanied by the drummers of the first brigade, who remain during the march past of the dismounted troops of the division.

After the march past of the last dismounted troops of the division, the musicians and the band execute left face at the signal from the leading regimental drum major and the bandmaster, and march at the fifth step, heads directed to the right.

519. If on the march in column of squads the musicians are at the head of the column, they form ranks of four men.

The buglers are on the right, and the battalion drum major 3 paces in front of the center.

The band follows the musicians, also in ranks of four men, the bandmaster in front.

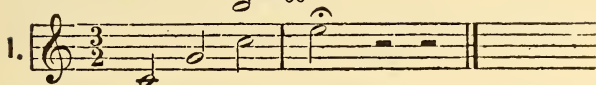
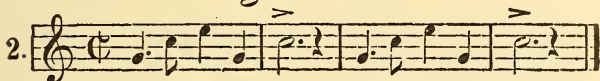
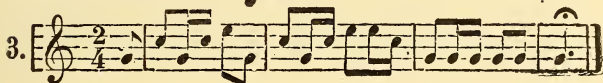
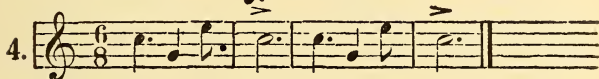
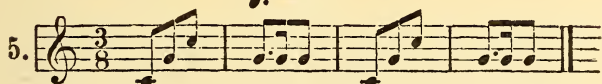
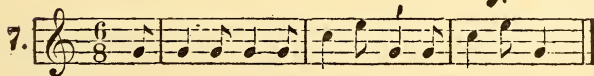
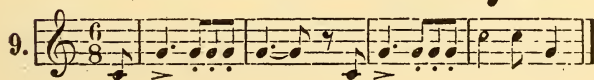
At **Marching order**, the musicians resume the places in their companies which are indicated in Plate IV.

Supplement I.—CALLS.

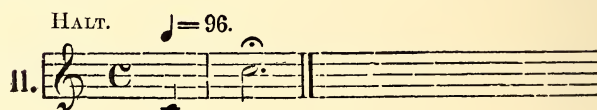
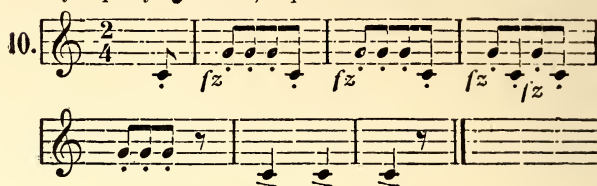
Calls are principally used in garrisons, and for the routine duties of troops (barracks, billeting and bivouac). At maneuvers the commander makes use of calls terminating the fight, for carrying it on, or for assembling the commanders or adjutants, as well as for assembling and recalling troops. In battle, calls are prohibited, except: **Fix bayonet**, **Quick forward**, and **Attention**.

LIST OF CALLS.

1. The entire unit.
2. I. Battalion.
3. II. Battalion.
4. III. Battalion.
5. IV. Battalion.
6. 1st Company (also fifth, ninth, and thirteenth).
7. 2d Company (also sixth, tenth, and fourteenth).
8. 3d Company (also seventh, eleventh, and fifteenth).
9. 4th Company (also eighth, twelfth, and sixteenth).
10. March. Played in the usual cadence, used in advancing; in rail journeys, the men disembark; when played rapidly, quick forward.
11. Halt.
12. Assembly. Formation in close order. When traveling by rail, the men embark.
13. Clear the road. See Field Service Regulations.
14. Attention. To signal the approach of cavalry; played slowly, prelude to tattoo.
15. For firing. (This call may only be used at target practice and notifies those in the pit that firing is to begin.)
16. Fix bayonet.
17. Commanders' call.
18. Adjutants' call.
19. Recall. The troops march off at the conclusion of the exercise.
20. The alarm. The quickest formation, fully equipped, at the places for alarm or for occupying designated points.
21. Fire call.
22. Retreat.
23. Reveille.

THE ENTIRE UNIT. $\text{♩} = 60$ I. BATTALION. $\text{♩} = 72$.II. BATTALION. $\text{♩} = 104$.III. BATTALION. $\text{♩} = 112$.IV. BATTALION. $\text{♩} = 92$.1. COMPANY (also 5'', 9'', and 13''). $\text{♩} = 88$.2. COMPANY (also 6'', 10'', and 14''). $\text{♩} = 112$.3. COMPANY (also 7'', 11'', and 15''). $\text{♩} = 112$.4. COMPANY (also 8'', 12'', and 16''). $\text{♩} = 112$.

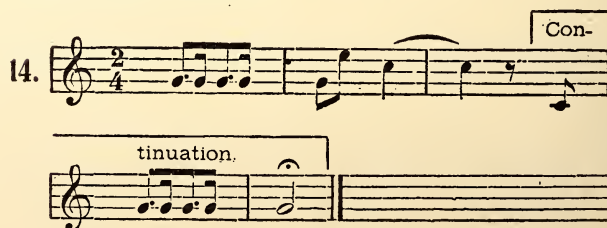
MARCH. Played in the usual time $\text{♩} = 114$, used in advancing; traveling by rail, the men get off; played very rapidly $\text{♩} = 120$, "quick forward."



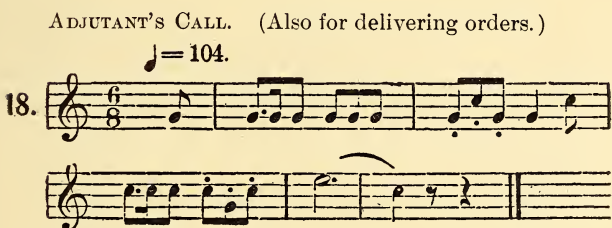
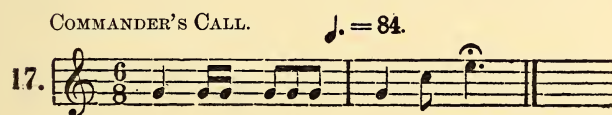
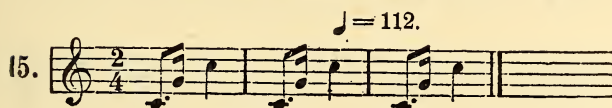
ASSEMBLY. Formation in closed order. When traveling by rail the men get aboard.



ATTENTION. On the approach of the enemy's cavalry $\text{♩} = 132$. Played slowly $\text{♩} = 72$ and with the continuation, prelude to tattoo.



FOR FIRING. This call can be used only at target practice, and notifies those in the pit that firing is to begin.



RECALL. The troops march off at the conclusion of the exercise.



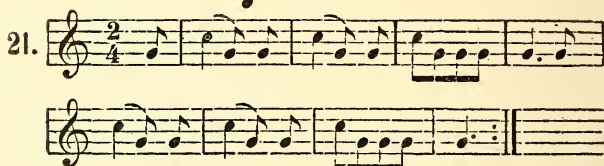
ALARM. The quickest formation, fully equipped, at the places for alarm or for occupying designated points.

$\text{♩} = 124.$



FIRE CALL.

$\text{♩} = 184.$



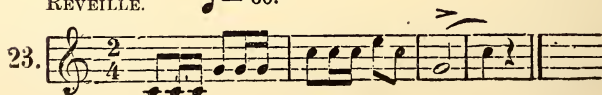
TATTOO.

$\text{♩} = 72.$



REVEILLE.

$\text{♩} = 60.$



Supplement II.—MARCHES FOR FIFE AND DRUM.

All infantry regiments play, while presenting arms, first No. 1 march and then No. 1 and No. 3, alternately, “present” marches as written in this supplement, unless particular marches have been conferred upon them or orders exist to the contrary.

As soon as one of the marches has been played through there is a pause of two steps before playing is resumed.

The marches are at the rate of 80 steps per minute.

- | | |
|--------|----------------------|
| No. 1. | } “Present” marches. |
| No. 2. | |
| No. 3. | |
| No. 4. | |

No. 5. March past in platoons, company front, and platoon columns (army march).

No. 6. For accompanying the band at march past in platoons, company front, and platoon columns (without fifes).

No. 7. March past in regimental column.

No. 8. For accompanying the band at march past in regimental column (without fifes).

No. 9. Prelude with fifes and drums joining in at march past.

No. 10. March while advancing.

No. 11. Salute to the color.

No. 12. Dead march.

No. 1. Old Prussian Grenadier March.

($\omega = 80$.)

The musical score is arranged in three systems, each with two staves. The top staff of each system is for the Fife, and the bottom staff is for the Drum. The key signature is one sharp (F#) and the time signature is common time (C). The Fife part consists of a melody with various note values and rests. The Drum part provides a rhythmic accompaniment using a variety of drum notations, including single strokes, double strokes, and patterns with beams and accents. The score concludes with a double bar line.

No. 2. (♩ = 80.)

Fife. $\underline{\underline{2}}$ *tr tr* $\underline{\underline{2}}$ *tr tr*

Drum.

tr tr $\underline{\underline{2}}$ *tr tr*

No. 3. ($\text{♩} = 80.$)



No. 4. (♩ = 80.)





NO. 5. MARCH PAST IN PLATOONS, COMPANY FRONT
AND PLATOON COLUMNS. (Army march.)

(♩ = 114.)



Fine.

Fine. *fz* *fz*

fz

1 2

fz *eg*

Da Capo.

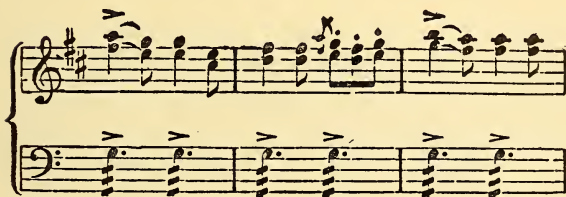
No. 6. FOR ACCOMPANYING THE BAND at march past
in platoons, company front, and platoon columns.
(Without fifes.)

(♩ = 114.)



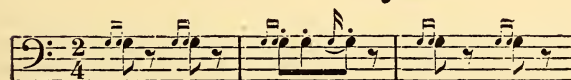
No. 7. MARCH PAST IN REGIMENTAL COLUMN.

(♩ = 114.)

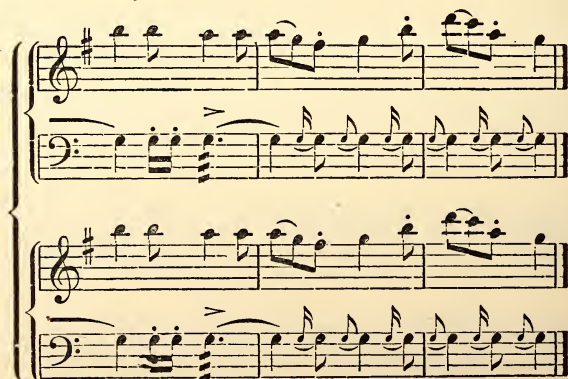


No. 8. FOR ACCOMPANYING THE BAND at march past
in regimental column. (Without files.)

(♩ = 114.)



No. 9. PRELUDE, with fifes and drums joining in at march past. (♩. = 114.)



No. 10. MARCH WHILE ADVANCING. ($\text{♩} = 114$ and 120.)No. 11. SALUTE TO THE COLOR. ($\text{♩} = 114$.)



No. 12. DEAD MARCH.

As soon as the coffin is carried from the house arms are presented. The drummers beat the usual march with muffled drums, the fifers do not play, the band plays a dirge without muffling its instruments. As the procession moves off and during the march, the drummers beat the dead march, the bandmen playing only dirges.



Roll of about } Prelude.
20 steps.



Prelude.



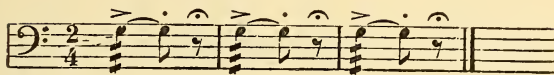
The drum-major gives the signal for the prelude after the roll of the drums as well as between the strophes of the dirge.

If there is no band present at the funeral procession, the fifers play the dirge.

Supplement III.—OTHER PIECES FOR FIFE AND DRUM.

- No. 1. Prelude to tattoo.
- No. 2. Old Prussian tattoo.
- No. 2a. Tattoo.
- No. 3. Prelude to special tattoo.
- No. 4. Special tattoo.
- No. 5. Church call.
- No. 6. Recall from church.
- No. 7. Reveille.
- No. 8. Assembly of guard details.
- No. 9. Signal to leave the marching column (Field Service Regulations), or dismissal; e. g., a guard on being relieved.
- No. 10. Relieving the guard.
- No. 11. General, for the drums.
- No. 12. Fire call, for the drums.

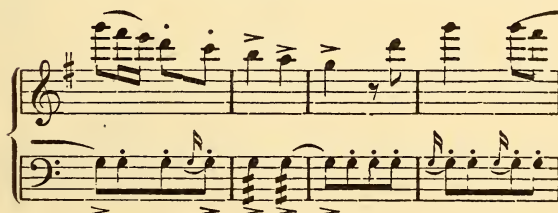
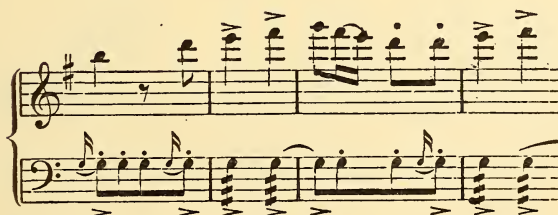
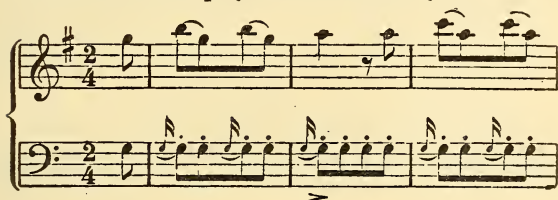
No. 1. PRELUDE TO TATTOO.



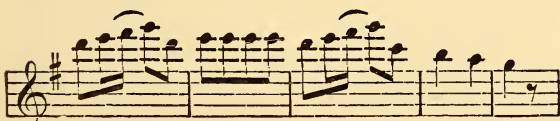
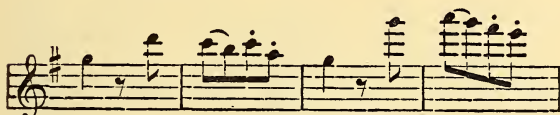
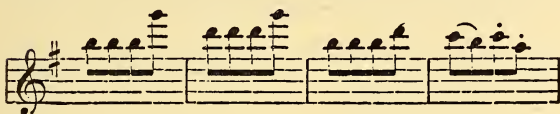
No. 2. OLD PRUSSIAN TATTOO.

(♩=80.)

The fifer can also play No. 2a alternately.





No. 2a. ($\text{♩} = 80.$)

No. 3. PRELUDE TO SPECIAL TATTOO.

All fifers and drummers. } One fifer Solo,
One drummer with the right stick.

Presto.

ff rulant, >

All fifers and drummers. } One fifer. "Twice from mark.
One drummer

ff

The regimental or battalion drum major gives the signal for beginning the roll as well as ending the same; the solo drummer and fifer continue the roll about one-half longer and play the last part alone, as is indicated.

No. 4. SPECIAL TATTOO.

(♩ = 114.)


(If the band plays, the fifers do not).

MARCH.

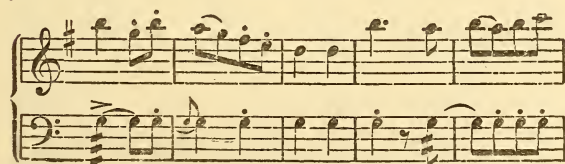
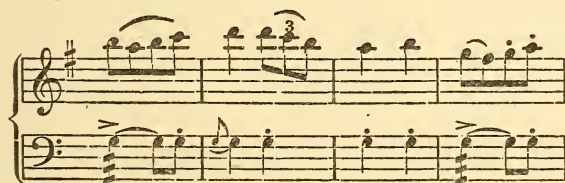
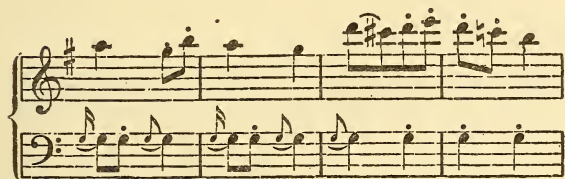
The measures until *Tutti* are beaten at a halt.

One drummer *Solo*.

Tutti.



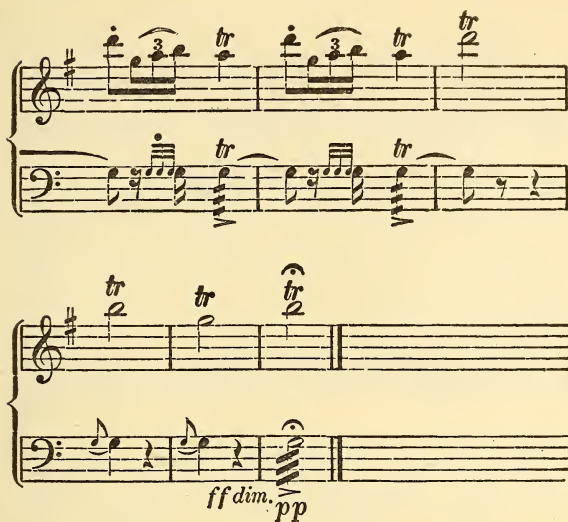
All the drummers.





No. 5. CHURCH CALL.





The last roll begins very marked and concludes *decrescendo* to *pianissimo*.

No. 6. RECALL FROM CHURCH.



No. 7. REVEILLE.





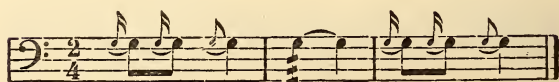
No. 8. ASSEMBLY OF GUARD DETAILS.

(♩ = 114.)

To save time the second part is not repeated. The prelude, No. 1, is played in this case.

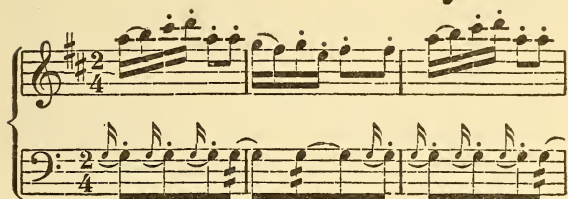


No. 9. DISMISSAL.



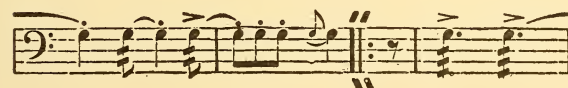
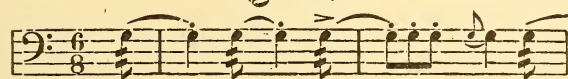
No. 10. RELIEVING THE GUARD.

(♩ = 114.)



No. 11. GENERAL, FOR THE DRUMS.

(♩ = 80.)



No. 12. FIRE CALL FOR THE DRUMS.



WAR DEPARTMENT :: OFFICE OF THE CHIEF OF STAFF

EXTRACTS FROM REPORTS
BY REGULAR AND MILITIA OFFICERS

ON

The Joint Army and Militia Coast-Defense Exercises

DURING THE YEAR

1907

Compiled in the Office of the
Chief of Artillery



WASHINGTON
GOVERNMENT PRINTING OFFICE

1908

WAR DEPARTMENT,
Document No. 313.
Office of the Chief of Staff.

TABLE OF CONTENTS.

	Page.
State of Maine.....	3- 21
State of Massachusetts.....	21- 81
State of Rhode Island.....	81-108
State of Connecticut.....	109-144
State of New York.....	144-167
State of New Jersey.....	168-172
State of Maryland.....	172-178
District of Columbia.....	178-190
State of South Carolina.....	190-210
State of Georgia.....	210-218
State of Alabama.....	219-225
State of Florida.....	225-267
State of California.....	268-317
State of Oregon.....	318-334
State of Washington.....	335-347

Extracts from Reports by Regular and Militia Officers on the Joint Army and Militia Coast Defense Exercises during the Year 1907.

STATE OF MAINE.

Artillery District of Portland.

[Date of exercises: August 8 to 18.]

COMMENTS OF REGULAR OFFICERS.

[Col. CHARLES MORRIS, Coast Artillery Corps, commanding artillery district of Portland, Fort Williams, Me.]

Requisitions were filled with satisfactory promptness and all camps were completed prior to the arrival of the militia on August 8, except that the railroads temporarily lost the McCall incinerators destined for Forts McKinley and Levett and they were not delivered till August 8 and not installed till August 9.

With the exception of the fact that the militia did not bring cots to camp the provisions of War Department General Orders, No. 99, with reference to camps were carried out in detail with good results.

The sanitation in general was excellent after two or three days of constant effort on the part of the surgeons and all regular officers concerned.

Both tin-lined troughs with sewer connection and McCall incinerators were used, the verdict being in favor of the incinerators.

The principal obstacle in the matter of transportation arrangements lay in obtaining from the State of Maine authorities an accurate inventory of the property to be shipped.

Further difficulties were encountered by reason of the plans prepared by the district quartermaster and the consequent orders issued from this office after consultation and agreement with the State of Maine authorities being subjected to hasty and inconvenient modifications by the independent action of the above-mentioned authorities in issuing orders modifying the accepted plan. In some cases this office received notice of such changes barely in time to modify the arrangements. In some cases no notice whatever was received.

EQUIPMENT OF THE MILITIA.

This was reasonably satisfactory, with the single exception of the absence of camp cots.

The men slept upon mattresses laid upon the ground and suffered no ill effects, but it is believed that this would not have been the case had the weather not been unusually favorable, there being no rain at all until the day of breaking camp.

Due to the fact that the nights are quite cold in this locality, even in summer, it is believed that all troops in camp should be provided with cots and mattresses or else cots and bed sacks filled with straw. Commanders of regular organizations are averse to taking their mattresses into camp on account of deterioration, and it is believed that it would be more economical to issue straw for this purpose.

Although the state of instruction of the militia upon arrival was a surprise and disappointment and necessitated certain changes in the programme during the preparatory period, it is a matter of distinct congratulation that such progress was made that the programme for the action period was well carried out without any modification whatsoever except that necessitated by payment to the militia being made on August 16.

Under present conditions the usefulness of the guardsmen in the Artillery Corps should be measured inversely according to their rank. It was an inspiring revelation to witness the zeal and facility with which those of the lower grades of rank took hold of their work at the guns and at the observing stations and the accomplished results. Naturally, those of the higher grades required more time, and, in some

cases, a more comprehensive technical knowledge to master with equal celerity their more numerous and important duties.

There is no doubt that the employment of a militia infantry regiment partly as artillery reserves and partly as artillery supports destroys the regiment's cohesiveness, because of the distinct differences in the character of the duties involved. It is a settled principle that the regimental organization is not adapted to coast artillery service and it is futile to attempt to make it so in our association with the militia.

DEFECTS OBSERVED.

1. The difficulty of obtaining from the State authorities accurate inventories of property to be shipped and the derangement of the plans of the district quartermaster by the independent action of the State authorities in issuing orders modifying the arrangements and in making special arrangements with the railroad companies for special trains.

2. Undefined status of militia troops and lack of any definite punishing power by the United States.

3. Insufficiency in numbers of militia troops assigned to batteries. Remedy suggested: Assignment of all line troops in the National Guard of Maine as artillery reserves. The total number of Maine troops in this encampment would not furnish more than one relief for all batteries in commission in Portland Harbor and would fall far short of furnishing one relief for all batteries both in and out of commission.

* * * However, should there be artillery supports to instruct, it is suggested that the proper lines of resistance for the defense of each fort be selected and that the artillery supports be assigned to definite sectors and instructed in the defense of the same and that it be made clear to them that such instructions are for such special positions and how they differ from the general instructions of field troops.

4. Unsuitability of the regimental organization for coast-artillery work. Any explanation of this well-known fact is, of course, unnecessary. By way of remark, it appears that this defect includes the defect of splitting up a regiment into reserves and supports. Remedy suggested: The formation of a State coast artillery corps.

5. Discontent on the part of some militia field and staff officers with their share in the exercises. It is believed that this was due largely to the fact that the employment of regular officers as instructors and coaches of the militia has a tendency to relegate the militia field and staff officers to the position of observers at such times when these officers are not actually being instructed themselves. It is not believed that the militia can be efficiently instructed without the employment of regular officers and from general observation on this subject (in particular the difference between the volunteer regiments of 1898 and those of 1899) it is not believed that satisfactory results can be obtained with raw troops unless the functions of all officers of a higher grade than company commander are performed by regular officers. Remedy suggested: To have the State coast artillery corps (artillery reserves) consist of independent companies.

6. Absence of camp cots for militia. Tent floors, cots, and mattresses should be provided those engaged in the joint army and militia coast-defense exercises. To keep the men well and let them rest comfortably when fatigued are primary elements of consideration. There is a marked difference in the conditions that obtained in the typical bivouac and the coast artillery encampment, and it is important in the interests of the Coast Artillery Corps to emphasize this difference.

[Maj. W. C. RAFFERTY, Coast Artillery Corps, commanding Fort Preble, Me.]

The pay department should be directed to send to each company commander a form of pay rolls made out as it is required to be presented. No suitable maps for infantry work on hand.

[Maj. CHAS. L. PHILLIPS, Coast Artillery Corps, commanding Fort McKinley, Me.]

The appearance of the militia at muster was very poor. A very large percentage of these men had been enlisted only two or three weeks previously and did not impress one as having enlisted with the intention of remaining in the service. The average strength of the companies was between 40 and 45 men.

Considerable progress in military requirements, drill, and discipline, was made. Behavior of troops, excellent.

The conduct of the Coast Artillery troops was in all respects, as to both officers and men, exemplary.

[Capt. JOSEPH WHEELER, Jr., Coast Artillery Corps, adjutant.]

States the unsuitability of the regimental organization for coast artillery work and suggests the formation of a State coast artillery corps.

Thinks the formation of a reserve coast artillery corps under Federal control would be attended with better results than an attempt to use the State troops for this purpose.

[Capt. L. C. BROWN, Coast Artillery Corps, mine commander and battery commander, batteries Carpenter and Ramsey, Fort McKinley, Me.]

Work of militia generally very satisfactory; showed much interest and were prompt in obedience to orders and instructions.

Combined personnel, regulars and militia, insufficient to man material to which assigned.

[Capt. R. F. WOODS, Coast Artillery Corps, district quartermaster.]

Calls especial attention to the zeal and efficiency of the quartermaster of the First Regiment and of the acting quartermaster of the Second Regiment.

States that all camps were satisfactory and completed before August 8, except that the delivery of incinerators for Fort McKinley was delayed by the railroad company until August 8.

[Capt. J. R. PROCTER, Coast Artillery Corps, battery commander, batteries Acker and Farry, Fort McKinley, Me.]

The interest and readiness shown by the militia was commendable, but the short period of instruction was insufficient to fit them for independent responsibility.

Commends discipline, order, and cleanliness of militia camp.

[Capt. W. H. MONROE, Coast Artillery Corps, battery commander, Battery Ingalls, Fort McKinley, Me.]

I am of the opinion that the militia could render valuable assistance to the Coast Artillery. Suggests a course of instruction and training. The companies of militia under his command did excellent work.

[Capt. C. M. SEAMAN, Coast Artillery Corps, commanding Fifth Company, Coast Artillery Corps.]

Work of militia very satisfactory.

Recommends that Company L, Second Infantry, National Guard, State of Maine, be assigned to Battery Garesche.

Recommends that the allowance of subcaliber ammunition be increased.

[Capt. A. C. THOMPSON, Coast Artillery Corps, commanding Twenty-fourth Company, Coast Artillery Corps, Fort McKinley, Me.]

The militia took keen interest in the work and before completion of exercises they were able to man a mortar very creditably.

The health of the men was excellent and the camp was free from disorder of any kind.

[Capt. C. H. HILTON, Coast Artillery Corps, commanding Forty-ninth Company, Coast Artillery Corps.]

Work of militia very satisfactory. Thinks it would be better to assign to a large gun battery a militia company of greater enlisted strength than 50 men.

[Capt. M. J. LENIHAN, General Staff, observer.]

In some cases commanding officers to whose posts detachments of militia were assigned for duty were not certain whether field returns and muster rolls of such troops were required by the Adjutant-General's Office and there has probably not been uniformity of action in this respect. It would be well if hereafter the general order prescribing these exercises would contain a positive statement as to what rolls and returns would be required and not leave it to conjecture. The necessary blanks where they differ from the regular army forms should be sent to the commanding officer.

Two forms of blank pay rolls for militia, Form 3, authorized November 19, 1903, and Form 32, authorized January 21, 1903, having slightly different requirements, were in the hands of the * * * militia and caused them some confusion. The blanks sent to any one locality hereafter should be uniform and instructions to destroy all of a previous date of authorization which they may have on hand should accompany them.

Complaint was made that only the exact number of blank pay rolls required were sent. A few extra copies to replace any that may be accidentally damaged or destroyed and to permit of the making of rough copies by the inexperienced should be sent.

The militia officers were in general unable to make up the pay rolls correctly and considerable of the time of their instructors was taken up in helping in their preparation.

The solution of the difficulty is to send a paymaster to report to the district commander for duty as a member of his staff for the period of the exercises. He will then be at hand to give instructions and directions for the preparation of rolls by authority of the district commander, the rolls will be in proper form and acceptable as vouchers when completed, and the artillery officers, particularly the district commander and his adjutant, can spend more of their time at their artillery work.

The sanitation of the camps was practically perfect. McCall incinerators, Reed troughs, and the post sewer systems were used for the disposal of excreta, either singly or in combination, as circumstances required. The McCall incinerators worked well. They are especially useful in camps where the water supply is limited.

I was informed that the artillery district boats which were sent from district to district for the maneuvers, were, with all the property aboard, invoiced from one district quartermaster to another as they went along the coast for a ten days' tour of duty in each district. This made considerable extra paper work and occupied the attention of artillery officers at a period when their time and energies were needed in their artillery work.

The requirement under the head of Pay Department that "all officers and enlisted men must present themselves in person at the pay table in order to receive their pay" should be omitted from the next order and the paymaster be permitted to give the pay of a man unavoidably absent on duty or for other cause to his captain, as is done in the regular service, when satisfied that the soldier so desires. It is almost impossible for any organization to bring all of its men at once to the pay table or for the paymaster to reach in person those unavoidably absent. To require the man to go

without his pay until a check can be sent him is to cause dissatisfaction and possible hardship. The matter might well be left to the judgment of the paymaster.

The sending of the student officers from the schools at Fort Leavenworth to various posts on the seacoast during the exercises proved to be a wise measure. These officers, while making themselves very useful as instructors of militia supports, had opportunity to observe something of the work of their brothers of the Coast Artillery and to acquire some knowledge of artillery material. Many of these officers had never seen a seacoast fort. Some of the artillery officers likewise had little knowledge of the work of the field army. Their coming together was mutually beneficial.

It would be well another year to send the Leavenworth student officers with their sketching cases to the various artillery districts about a week in advance of the opening of the exercises with instructions to make suitable maps of the islands and of the mainland to a distance of 10 miles from the post. Blueprints of these maps should then be filed at post headquarters and the originals filed in the map section of the military information division, General Staff.

It was necessary in the artillery district of Portland for the instructors of the supports to spend some days in giving the companies the instruction which should have been given them in their armories. There is no use in sending men into the field for practical instruction who have not mastered the details of infantry drill.

Having seen the instructors sent from the service schools, West Point, and other posts cheerfully performing the duties of drill sergeants I inquired into the necessity therefor and learned that many of the men were the rawest recruits who had had no previous instruction whatever.

The pay rolls of the companies of the Second Maine Regiment showed the following:

Company E, enlisted strength 45, of whom 23 were enrolled in July and August, 1907;

Company F, enlisted strength 49, of whom 21 were enrolled in August; and

Company G, enlisted strength 28, of whom 18 were enrolled in July and August, 1907.

It is thought that this recruiting up just for camp could be in part avoided if the appropriation for the exercises could be secured from Congress a year in advance and all arrangements definitely made without the haste which is now necessary. Corporations and other employers of large numbers of men must know sufficiently in advance of the dates on which individuals wish to be absent from their places in order that vacation schedules may be arranged to accommodate the greatest number and interfere least with their regular business. On account of the short time which now elapses from the date of approval of the appropriation bill to the opening of the camps militia men find it difficult to secure permission to be absent on the exact dates of the camps, officers have difficulty in mobilizing their organizations, and the places of trained men are filled by gathering in raw and sometimes unsuitable material to make up the required number for camp.

The last statement showing the enlisted strength of the organized militia force gives it as 97,071. If the ratio of untrained men in this militia force is the same as that given above for the three companies of the Second Maine who were at Fort Williams, there are 41,740 untrained men and only 55,331 men with more or less training. From my experience with militia in different and widely separated States I believe that the ratio given above of instructed to uninstructed men in the militia force holds true throughout the Union and that in the returns of militia 40 per cent should be regarded as raw recruits.

The seacoast States should be encouraged to form militia coast artillery organizations or to transform existing organizations into such. Many men who can not now join the militia for fear of being sent from home and business in time of war might then seek service in the militia, feeling such that their duty in time of war would be in the home defenses. I believe that if these organizations are formed we will gradually build up a fair artillery reserve.

The next step in the march of combined instruction should be the establishment of coast-guard camps of the mobile army. This would give officers an opportunity to study the identical ground over which they will have to work in case

of invasion, while at the same time keeping up their field training.

In preparing problems for solution in the large camps of instruction effort is made to change the conditions and assume situations new to the troops and made to simulate the changing conditions presented to a moving army. Ever so, the terrain becomes eventually so well known that the best results can not be secured and the exercises become a repetition of the same problems. If the coast-guard divisional camps were established this familiarity with the terrain instead of being an objection would be an advantage. The better acquainted troops become with the terrain along the coast the better it will be. It is the exact ground on which they will have to fight in time of invasion. The situations assumed will be such as might be looked for in war.

The next step would be a combined attack and defense by both Army and Navy by land and sea on some selected harbor.

The object of the maneuvers this year was to present to the militia the situation in outline, to explain to them that some men handle the guns, that to protect the immediate rear of the batteries are the infantry supports, and that back from the coast line is the coast guard, not represented at this year's exercises. This object seems to have been accomplished. Interest and enthusiasm were shown generally by the officers and men of the militia * * *, who expressed themselves as well satisfied and anxious to return next year for a similar tour of duty.

[First Lieut. FREDERICK S. MACY, assistant surgeon, U. S. Army, surgeon.]

Considerable ignorance of the requirements of camp police, care of latrines, and disposal of waste was very noticeable during the first two days in the militia camps.

The McCall incinerators appeared to be all that is claimed for them.

Both officers and enlisted men manifested a willing disposition to correct defects noted.

At the close of the exercises the medical officers stated that they had learned considerable from the maneuvers and that this had been their first opportunity to witness regular corps methods.

Thinks that some advantage could be derived by detailing medical officers as instructors to State encampments. So far as could be observed here State medical officers are willing and anxious to learn the military side of their profession and are glad to adopt suggestions or to receive instruction proffered in a proper spirit.

Recommends that McCall incinerators be located with due reference to the natural air currents, preferably on high ground, in order to prevent back drafts.

[First Lieut. J. F. WALKER, Coast Artillery Corps, district artillery engineer.]

It was a source of pleasure to note the interest taken and the progress made by the two militia companies assigned as reserves to the batteries.

[First Lieut. G. W. COCHEU, Coast Artillery Corps, communication and search-light officer, Fort McKinley, Me.]

Comments upon interest shown by the militia staff officers in the work of the battle commander's station as very little.

[First Lieut. F. Q. C. GARDNER, Coast Artillery Corps, range officer, Fort McKinley, Me.]

The work of range details, militia, was satisfactory, and they seemed much interested.

Makes suggestions as to system of assignment of militia to coast artillery work, recommending either educational qualifications or that they be attached a short time each year to the battery to which assigned.

[First Lieut. A. G. PENDLETON, Coast Artillery Corps, at Battery Ingalls, Fort McKinley, Me.]

The militia displayed great interest and I am of the opinion that guns can be successfully manned by volunteer troops working with regular troops.

[First Lieut. Q. GRAY, Coast Artillery Corps, at Battery Ingalls, Fort McKinley, Me.]

States impressions received when as adjutant he accompanied the commanding officer at inspection and muster at arrival of militia. Impressions in the main unsatisfactory. Concludes that the majority of the militia sent to this post was composed of men out of work and looking for ten days' employment and without interest in military affairs.

So far as the manual labor of loading was concerned the militia reached a high degree of efficiency; but as regards duties requiring skill and training they made but very little headway and showed no improvement.

Comments upon the clerical work of the militia, preparation of muster rolls, etc., as being very poor.

[First Lieut. R. S. PRATT, Field Artillery, at Battery Ingalls, Fort McKinley, Me.]

Believes that combined exercises were successful in two points—interesting the militia as a whole in coast-artillery work and emphasizing in their minds the needs of the coast-defense forces and the amount of work necessary to make efficient coast-artillery men.

The militia showed great interest and did remarkably good work.

Advises the permanent assignment of militia companies to batteries and that stated drills should be had by them throughout the year.

[First Lieut. H. L. MORSE, Coast Artillery Corps, at Battery Acker, Fort McKinley, Me.]

Comments favorably upon character of work and interest shown by militia. States that Company M, First Regiment, National Guard, State of Maine, desires strongly to be permanently assigned for duty as coast artillery reserves.

Comments upon ignorance of militia, officers and men, of even the elements of military courtesy.

Recommends as a possible effective method of increasing the efficiency of the militia as coast artillery reserves (*a*) a correspondence school for officers and (*b*) a school for gunners with militia officers as instructors.

Suggests attendance of militia at night drills at nearest fort as a means of instruction.

[First Lieut. W. S. WOOD, Field Artillery, at Battery Ramsey, Fort McKinley, Me.]

The work and results were on the whole satisfactory. The militia showed a great deal of interest and a surprising aptitude.

[First Lieut. M. P. ANDRUSS, Coast Artillery Corps.]

Considering the disadvantages under which they labored the State troops did remarkably good work and should be encouraged to keep it up in the future.

[First Lieut. GEORGE M. MORROW, Jr., Coast Artillery Corps.]

States relation between the militia officers and the regular officers was most cordial.

The militia seemed to have trouble in making out their pay rolls.

Recommends that some representative of the Pay Department be sent to these camps to give the militia officers instructions as to the proper way to make out pay rolls.

[First Lieut. W. W. BALLARD, Jr., Coast Artillery Corps.]

Thinks the militia profited both in discipline and instructions during their encampment.

[First Lieut. E. M. WILDRICK, Coast Artillery Corps.]

States the range section taken from the militia were eager to learn and after the first day did practically all of the work. They are now capable of rendering efficient service.

[First Lieut. W. M. COLVIN, Coast Artillery Corps.]

States skilled artillerymen can not be made in a day, but only by constant application; training of the militia coast-artillery work is a great step toward the improvement of our national defense.

States the feeling of fellowship between militia and regulars was especially manifest.

INSTRUCTORS OF SUPPORTS.

[Capt. ARTHUR S. COWAN, Twentieth Infantry, U. S. Army, Fort Williams, Me.]

A programme of instructions for these troops had been prepared in advance but it was found that they were not well enough instructed to take up the proposed work.

While the maneuvers, as far as the infantry troops were concerned, were to my mind very unsatisfactory these troops

undoubtedly received some valuable instruction and improved very much in their general appearance, in the manner in which they performed their duty, and in their work in the field.

[Capt. W. H. JORDAN, Twelfth Infantry, U. S. Army, Fort McKinley, Me.]

The programme of exercises could hardly be improved upon.

The work of militia was generally satisfactory.

Both officers and men exhibited greatest desire for instruction but showed great lack in even the most rudimentary knowledge, including the simplest company movements.

[First Lieut. W. R. STANDIFORD, Second Infantry, U. S. Army, Fort McKinley Me.]

Comments upon ignorance of militia as to sanitary arrangements in camp, of the enlisted men in drill and discipline, of the officers in fundamental principles and elements of drill regulations, and of the small size of the companies and the resultant hindrance to work.

[First Lieut. S. C. LEASURE, Fourteenth Infantry, U. S. Army, Fort McKinley, Me.]

States difficulties met in forming detachments for Gatling machine guns.

Comments upon prior lack of instruction of militia in all matters connected with drill and discipline.

[First Lieut. LEWIS S. MOREY, Twelfth Cavalry, U. S. Army, Fort Preble, Me.]

Gives a detailed account of the work done, including the preparations of orders; he believes that the daily period of instruction should be lengthened and the encampment period made three weeks, thus giving them time for instruction in field engineering and topography.

[First Lieut. BRUCE PALMER, Tenth Cavalry, U. S. Army, Fort Williams, Me.]

States that he was on duty with Companies A, E, G, F, I, and M, Second Infantry, National Guard State of Maine. In all of these companies the appearance, discipline, and training of officers and men was, almost without individual

exception, poor. Company I, of Eastport, Me., was the worst of the organizations in these respects.

States that little care was taken of the arms, except in Company G. The rifles were dirty and rusty and throughout the exercises the men treated them with indifference as to keeping them clean or saving them from injury.

The noncommissioned officers knew very few of their duties on the drill or maneuver field or in connection with the interior economy of the company. The company officers were also generally ignorant in these respects. It was seldom that a company would be found formed and with all officers present within ten or fifteen minutes after the assembly had sounded. The enlisted men, especially the noncommissioned officers, seemed to profit more from the instruction given than the officers.

Recommends that an officer or experienced noncommissioned officer of the Regular Army be detailed for the purpose of teaching the militia the rudiments of close and extended order drill, guard duty, and handling the ration.

Further recommends that instructors be sent to the camp several days ahead of the practice period to prepare maps of the terrain and a schedule of exercises; also that regiments be not split up into detached independent units.

[First Lieut. C. O. SHERRILL, Corps of Engineers, Fort Williams, Me.]

The plan of placing infantry supports in camp in artillery posts does not seem conducive of the best results. Thinks the militia will be far more effectively prepared to defend a seacoast fort from land attack by a thorough training in security and information and minor tactical problems at maneuver camps located in terrain specially suited to the solution of a large number of the various classes of problems.

Thinks the separation of militia commands causes discontent and that it would be well to organize militia coast artillery companies whose special function is the handling of heavy guns.

Thinks that detailed maps of the maneuver camps should be made previous to each encampment by detachment of engineer troops.

COMMENTS OF MILITIA OFFICERS.

[Col. CHARLES COLLINS, commanding First Infantry, National Guard of Maine.]

I am of the opinion that better and more lasting results would have been obtained if one regiment had been detailed as artillery and the other as supports.

Extends good will and best wishes to the officers and enlisted men of the Regular Army for their aid and assistance.

[Lieut. Col. JAMES L. MORARITY, First Regiment, National Guard of Maine.]

The camp sites were excellent.

The men showed a deep interest in the instructions which were very thorough.

I am of the opinion that the tour of duty was most satisfactory and instructive.

[Lieut. Col. FRANK M. HUME, Second Infantry, National Guard of Maine.]

Recommends that one of the Maine regiments be organized as coast artillery.

[Maj. FEN B. THOMPSON, Second Infantry, National Guard of Maine.]

States that an undoubted improvement was noticed in the entire personnel of the militia each day.

[Maj. GEORGE McL. PRESSON, Second Infantry, National Guard of Maine.]

Noticed that the men of the regulars and national guard exchanged good fellowship and among the reserves this affiliation of the men was noticeably a benefit to the guardsmen in the matter of courtesy.

The companies which took part as reserves and helped man the batteries were enthusiastic over the work and would welcome becoming artillery.

[Maj. BIAL BARDBURY, surgeon, First Infantry, National Guard of Maine.]

Habits of men excellent.

Recommends that company commanders be more particular in regards to the foot wear of their men.

[Maj. E. M. FULLER, surgeon, Second Regiment, National Guard of Maine.]

It was the best behaved and most sanitary camp he has seen in an experience of fifteen years.

Recommends that hereafter in every camp controlled by the national-guard a bountiful supply of clean towels for washing and cheese cloth for covering meat and food, be supplied.

[Capt. F. B. SPEER, commissary, First Regiment, National Guard of Maine.]

Acknowledges assistance and instruction received from regulars.

[Capt. FRANK E. CUMMINGS, First Infantry, National Guard of Maine.]

Believes that a reserve artillery corps should be organized in the State of Maine containing such companies of the guard that are on or near the seacoast.

Recommends a system of pay during the year, by the month.

Recommends a thorough course of instruction, practical and theoretical.

States that the service must be made more attractive in order to retain men in the service.

States that the State owns all of the clothing and that a man * * * objects to wearing a uniform worn by several others before him and recommends that a clothing allowance be given each man based on the clothing allowance of the Regular Army.

[Capt. HERBERT I. LOW, First Infantry, National Guard of Maine.]

States that the tour of duty was very instructive.

[Capt. M. E. BENNETT, First Regiment, National Guard of Maine, commanding Company F (supports), Fort McKinley, Me.]

The men have received more instruction during this tour than at any other camp.

The regulars, officers and men, were at all times courteous and ready to instruct.

[Capt. H. L. LOWELL, First Regiment, National Guard of Maine, commanding Company M (reserves), Fort McKinley, Me.]

My men were very much interested in artillery work and favor the artillery; my feeling is the same.

[Capt. FRANK E. DRAKE, Second Infantry, National Guard of Maine, Adjutant.]

The instruction given the infantry supports was very fine.

The companies assigned to the guns were intensely interested in their work, hoping for the same experience at some future maneuver.

Thinks that some definite duty should be assigned to the several field and staff officers, as they received no direct benefit except as observers from the encampment.

Recommends that in the future his office be supplied with up to date blank forms.

[Capt. BLAINE OWEN, Second Regiment, National Guard of Maine, commissary.]

Thinks regimental commissaries and battalion quartermasters should receive more attention in the matter of instruction from the regular army officers.

[Capt. WILLIAM E. SOUTHARD, Second Infantry, National Guard of Maine.]

States that the benefit received from the tour of duty was very great.

Suggests that in future encampments that the troops going into camp should not be split up into units smaller than a battalion.

Believes that better results would be obtained if troops required for coast defense be organized as such and go into camp each year at some fort. And that the remaining troops remain as infantry and be drilled in that branch of the service only by the regular army officers.

[First Lieut. C. F. KENDALL, assistant surgeon, First Regiment, National Guard of Maine.]

Pleased to note feeling of good will between regulars and militia, particularly so as to Hospital Corps.

[First Lieut. OLIN M. SMITH, battalion adjutant, Second Infantry, National Guard of Maine.]

Thinks the State of Maine should furnish at least a part of the force to man her coast defenses.

States that considered along educational lines the tour of duty was a most profitable one.

[Second Lieut. J. Y. KINMOND, Company M, First Regiment, National Guard of Maine.]

Notes improvement of militia in discipline, military courtesy, and instruction from contact with regulars.

States that men have shown great interest in and are favorable to the artillery work; has himself the same feelings.

[Second Lieut. JAMES W. HANSON, Second Infantry, National Guard of Maine.]

Speaks of the late arrival of baggage and the attending discomforts.

Believes that the period should not be less than two weeks and hopes that a bill may pass making 12 companies of coast artillery in the State of Maine.

[Second Lieut. ELSON A. HOSFORD, Company L, Second Infantry, National Guard of Maine.]

States duties performed during the exercises and recommends that Company L be turned into a company of coast artillery and recruited to 70 men.

[Second Lieut. RALPH H. WHITNEY, Second Infantry, National Guard of Maine.]

Recommends that Company L be changed into a company of coast artillery and recruited to 70 enlisted men.

STATE OF MASSACHUSETTS.

Artillery District of Boston.

[Date of exercises: July 27 to August 3.]

COMMENTS OF REGULAR OFFICERS.

[Lieut. Col. W. B. HOMER, Coast Artillery Corps, commanding artillery district of Boston, Fort Banks, Mass.]

Preparation for the joint encampment of regular and militia troops was promptly entered upon based upon circular No. 17, War Department, current series, and General Orders, No. 99, War Department, current series, and were complete in every particular and as to all supply departments previous to the arrival of the militia troops designated.

The encampment was complete in the afternoon of the first day of the period authorized, and the programme as arranged and published in memorandum referred to was carefully followed at all posts except as to subcaliber practice one morning, abandoned on account of fog.

There was no case of infraction of discipline coming under the observation of any post commander, no sickness necessitating treatment in field or post hospitals, and no accidents were reported, except a broken wrist due to scuffling, and one accidental discharge of a blank cartridge causing a skin abrasion. The conduct of all troops was exemplary and all duty was performed in a zealous, enthusiastic, and soldierly manner.

In every report the exercises have been characterized as interesting, beneficial, or some such term of approval. The consensus of opinion is that the project as outlined in circular No. 17, War Department, current series, is not only feasible but would prove most successful, provided sufficient troops were supplied. It would require fully twice as many artillery troops, both regular and militia, to furnish one relief to the elements of defense of Boston Harbor to-day, and two regiments of infantry for strictly infantry supports should be provided.

The work was handled with extraordinary skill and judgment throughout and the plotting as judged from track charts was exceptionally accurate.

The following personal report on the coast defense exercises in this artillery district from July 27 to August 3, 1907, inclusive, is offered in this connection.

I have but few comments to submit. The idea of these exercises with State troops as artillery and infantry reserves and supports is excellent. The result far exceeded my most sanguine expectations. I have nothing but surprise and admiration to express for the work of the State troops.

The programme of daily routine was severe and exacting, yet it was carried out with zeal, enthusiasm, and cheerfulness by the State troops. The artillery work was progressive and to such an extent that on Friday afternoon I was able to turn the guns, all stations, and all commands over to State troops and to go out myself with the fleet to see the work of a reconnoissance in force, to develop the gun positions and amount of gun fire bearing on Broad Sound Channel and the work was fine and the fire heavy.

The Massachusetts corps of artillery is fit and equal to the task of artillery reserves. There should be more of them. When Fort Standish has its armament completely installed, as may be next year, 6 companies of State troops could be used there alone and 20 to 24 companies of Massachusetts corps of artillery can be profitably instructed in Boston Harbor forts.

Enthusiasm on part of State and United States artillery troops is noted.

Two regiments of Massachusetts infantry as supports can be used in this district. Three companies of infantry is a

good unit for a post—one company, as at Fort Warren, is too small a command.

I was able to assemble the whole Fifth Massachusetts Infantry for a problem in attack and to enable the colonel to have his men together. The event was most successful.

The men entered zealously into this action, as well as into a movement and attack from small boats on the night previous. All State troops proved themselves gluttons for work, anxious for instructions and all whom I interviewed pronounced the week a most valuable one and worth many years of such camps as they usually had. Their work was practical and valuable and the whole scheme is excellent and its general outlines and details can not be improved on.

There is no time for any remark on the searchlight question, as this district has no searchlight installation worthy of the name. I suppose that is to come.

The press generally seem surprised at the searchlight deficiency.

My recommendations would be:

1. More artillery reserves—we can instruct more, and more are needed to man guns already mounted.
2. More infantry supports—to give larger and more profitable units of instruction.
3. Longer camp period—I believe every other State has a longer camp than Massachusetts.
4. More boats for the hostile fleet.
5. More United States artillery officers in exercise districts.

I have nothing but praise for the work of the State officers and men; they had a hard day's work every day yet they were zealous and enthusiastic. Their behavior was exemplary and they seemed to appreciate the confidence and trust accorded them. Their work everywhere was fine. Their drill good, their subcaliber shooting excellent, and their work in the range stations marvellous.

If encouraged I believe with an equipment of W. & S. azimuth instruments, range, deflection, and plotting boards, the artillery reserves can, by use of commercial telephone lines and rooms in view of adjacent waters, so perfect themselves in our position-finding service as to be able at any

time to take their positions in any B' or B" station with a minimum of instruction.

Boston Harbor is very favorable for this work with shipping as targets.

I have no criticisms whatever to make; I am so filled with enthusiasm at the marvellous work of the week that I can only praise it.

The joint tour of duty was performed in a zealous, enthusiastic, and soldierly manner. No case of infraction of discipline was reported and reports show a most satisfactory feeling of comradeship between the regular and militia forces.

LITERATURE, INSTRUMENTS, ETC., FOR ARTILLERY RESERVES.

The great need of the artillery reserves from this time forward is instruction. It is generally recommended by regular and militia artillery officers that the latter should be supplied with drill regulations, not only of the guns, but position-finding service, gunnery, cordage, etc., together with ordnance pamphlets on the various guns to which the organization is to be assigned.

Some arrangement should be made whereby instruments, plotting boards, deflection and range boards could be supplied to the several armories for indoor instruction. This matter may be covered more in detail when reports of the militia artillery are received.

[Maj. HENRY C. DAVIS, Coast Artillery Corps, commanding Fort Andrews, Mass.]

During the day phase two battle ships and two cruisers lay off the harbor and finally came in. This gave the opportunity for a real battle-command drill and was commented on by several officers in my hearing as affording facilities for instruction not obtainable in using commercial shipping, which is scattered and not in column or line and not acting together.

When there are available several boats, even launches, it will materially assist in the drill of a battle command if they will mobilize and make an attack in column or line or other formation. This may be done whenever there is battle-command drill and will also assist in fire-control drill. I feel that this is a very important matter.

THE RESERVES.

I found the officers and men willing and apparently anxious to learn, and I believe a considerable amount of good came from the exercises. While this effort must be commended highly and openly the idea must not be conveyed that they can replace the regulars, who keep alive and push forward artillery work. The latter will ever be instructors and the former pupils from the nature of things.

CAMP SITES, UNIFORMS, ETC.

Those selected for artillery were near the guns and for infantry on the neck at the end of reservation. They were quite good as to comfort and location. A great deal of work had to be done before these could be occupied and it is strongly recommended that if the exercises are to be repeated next year that these sites be made semipermanent by connecting with the post sewer and putting in permanent water supply. The cost of this will not be excessive and will add greatly to the comfort of the men as well as save expenditure for some of the sanitary squads.

The camps of the regulars and artillery reserves were entirely separated in accordance with orders, but due to limited space were quite near. Observation and report indicate that this nearness was a great advantage to the reserves who were continually on the watch to see "how the regulars did it," meaning all the details of work and camp life. The most difficult task was to make the reserves keep kitchens, tables, and latrine seats clean, and a marked superiority in this respect was noted for those militia companies camped near the regulars.

I believe that a regular infantry company camped near the supports would have been of much benefit.

The State does not apparently furnish its troops with scrubbing brushes, lye, brooms, etc., nor rakes in sufficient numbers, so that much of the lack of police is due to lack of convenience. Some men also come to camp with old or ill fitting uniforms because the sizes are issued regardless of the size of the men.

Because of these two conditions it is recommended that an issue be made to militia direct or that the post quarter-

master be authorized to sell these articles for cash or as a charge against the militia fund under such restrictions as may be made to prevent abuse. The articles of uniform referred to may well be restricted to the brown canvas chambray shirts and campaign hats.

PERMANENCY OF DETAIL.

If the results of exercises warrant their repetition, and I believe they do, it is recommended that organizations of artillery reserve be regularly detailed to specific batteries and know that they will work at them.

I believe this will inspire the companies to work along lines pertaining to special types of guns. I have already had an application to allow detachments to come to the post from time to time to work at the batteries here.

[Maj. C. P. TOWNSLEY, Coast Artillery Corps, battle commander (northern battle command), Fort Strong, Mass.]

ARTILLERY DUTIES, DRILLS, MATERIAL, COMMUNICATIONS.

In general the State troops, both artillery reserves and supports (infantry), showed a zeal and intelligence very commendable. In some respects they surpassed my expectations, particularly in acquiring knowledge in the use of the instruments and appliances used in coast-artillery work. The brief period of the encampment, giving them practically only five days for drill, instruction, firing, and phase exercises was not sufficient to accomplish as much as desired, and it was largely due to the several visits to this post of State officers and details from their companies to the range towers for instruction previous to the encampment that so much was accomplished.

Attention is invited to the present strength of companies in the corps of coast artillery, Massachusetts Volunteer Militia—63 enlisted. To man one battery of two 10-inch guns 86 men are required. The strength of State companies (artillery reserves) should correspond, in time of war at least, to the batteries they are to man, and in time of peace I think their strength should be increased sufficiently to man two guns of a battery during encampment.

The zeal and interest shown by corps of coast artillery companies, I think, warrant the supply in their armory of so much of the range-tower equipment as possible. This should include 1 Warner and Swasey type B instrument (to be used in conjunction with type A in horizontal base work), 1 Swasey type A, a plotting board, deflection board, range board, wind-component indicator, etc., as well as telephones to be installed as for a regular battery. All of these appliances would be installed cheerfully and well by the regiment itself. A little help or superintendence from a regular officer might be required, but as to the electrical part of it the regiment has experts fully competent to install and care for the instruments.

The State artillery troops should also be supplied amply with coast artillery drill regulations, position-finding service, etc., and the regular companies not required to loan them their copies.

While as stated above the work of the artillery reserves was most commendable and beyond my expectations it must not be inferred that these organizations are by any means qualified for independent work. This can only come from continued practice; team work must be yet acquired. Superficially observed they might appear to be doing quite as well in range-tower work as the regulars, but a critical observation always showed irregular results and serious errors. I do not say this in criticism but in explanation of my reasons for the following recommendations:

1. That the period of these annual encampments for artillery reserves be such as to give them not less than ten days at the guns and towers.

2. That at least five of these days be devoted to nothing but drills and instruction with no attempt at target practice, attacks, or phases. These are of no real value until the men are well drilled and familiar with their duties.

3. That the remainder of the period of encampment be utilized for target practice, simulated attacks, etc., in addition to further drills.

In this connection I desire to emphasize the necessity of more regular officers to assist in the work of drill and instruction during these encampments. There should be a regular officer in attendance throughout each drill in every

range tower, at every emplacement of 8-inch, 10-inch, or 12-inch guns or battery of smaller guns served or manned by the reserves, as well as one for every officers' position in battle and fire commands.

THE INFANTRY SUPPORTS.

Two companies, B and H, Fifth Massachusetts Infantry, constituted this force at Fort Strong. To one of these companies two .30 caliber gatling guns were assigned and detachments instructed in their use.

The infantry, both officers and men, showed a determination to learn and performed their duties with credit.

The work given the infantry was purposely intended to be different from their usual previous camp instruction and largely of the character that they would be called upon to perform as supports to the Coast Artillery in time of war.

The regular infantry officers detailed as instructors in this work were untiring in their efforts and pains and the results obtained most satisfactory.

[Maj. E. W. HUBBARD, Coast Artillery Corps, fire commander second fire command, Fort Revere, Mass.]

Recommends fixing status of State troops and question of command. At present there is no way post commander can enforce his orders or punish delinquencies except by making request of militia commanders.

Report of delinquencies could be made to higher militia authorities, but this would be after the event and would not serve the purposes of discipline at the time. As a matter of fact, so anomalous was the situation that the militia troops, legally, were only a body of citizens visiting the reservation. It is doubtful if post commander could legally confine a militia man for a military offense or do more than eject him from the reservation. As jurisdiction over this reservation has been ceded by the State, it is also doubtful if militia officers can legally punish militia men for offenses originating on the reservation. Fortunately during this encampment no case calling for discipline arose and the militia cheerfully conformed to all rules and orders issued by the post commander. However, the situation is an anomalous

one and should be definitely settled by appropriate legislations.

The militia troops have shown a decided aptitude for coast-artillery work. All duties were performed with intelligence and alacrity. My observation of the infantry work was necessarily limited and mainly turned over to the regular officers detailed as instructors. As far as artillery is concerned the militia will form effective reserves. They should be linked with regular companies and not assigned to inferior armament.

[Maj. H. L. HAWTHORNE, Coast Artillery Corps, observer of exercises.]

The introduction of a night phase as an opening operation brought out the weaknesses of new men, new material, and want of sufficient training, and should therefore, in my opinion, not have been attempted until later in the week. A night attempt on the mine fields protected by a regular company with well-trained men and a proper equipment of searchlights in good working order might have properly constituted an early phase, but with three-fourths of the armament of the fort manned by volunteer militia who had fired their first blank charges the day of the phase and but partly drilled in tracking and laying guns, confusion necessarily arose. It was plain that Fort Strong needed at least four searchlights in order to cover the waters of approach.

The telephone service, almost exclusively in the hands of the volunteer militia, fell to pieces in the presence of excitement. Much more practice is necessary in this adjunct than the time so far has allowed, but even with much better trained men it would seem that too much of serious or even of fatal importance hangs by this very slender thread. It seems to point, in my opinion, to simpler methods of fire control and much less frail and uncertain means of communication.

The second phase began at 9.30 p. m. and was practically a repetition of the first; namely, attack on the mine fields of both battle commands followed by an attempt to run by through the main channel. Cruisers again appeared in Nantasket Roads, taking Forts Strong and Warren in reverse, and were met by rapid-fire guns from both forts as well as from Fort Andrews.

The 60-inch searchlight at Fort Strong again failed to pick up the battle ships until they had approached to within 2,400 yards of the fort although they were sighted at 6,000 yards, but could not be positively identified. The lack of both searching and illuminating lights was again felt, the one light having to do duty for both. In consequence, before the leading vessel could be disabled the second was able to approach even nearer without molestation.

There is a belief among the militia officers of the Corps of Coast Artillery, Massachusetts Volunteer Militia, that if the Government would provide for the use of the corps at the armory in the city of Boston a complete equipment for tracking and plotting, including instruments, telephones, connections, etc., such as are furnished for primary and secondary stations, much of the preliminary work now requiring three to four days preparatory instruction could be reduced to one or two.

The district commanders plan to eliminate practically all instruction except purely artillery instruction for the militia reserve during their camp and the orders of the post commander at Fort Strong having the same idea in view were most welcome to the officers of the militia. Heretofore considerable of this short period of instruction had been given to infantry drill and instruction in guard duty. These have been reduced to the least possible limits, and its beneficial effect, such as enabling company details to remain permanent during the tour, suggests the necessity of keeping this method in view at all similar encampments in every artillery district.

Interviews with numerous officers and men of the Corps of Coast Artillery of Massachusetts Militia convince me of their perfect satisfaction in the character of the military work to which they have been assigned. This corps under various names has been used in the capacity of coast-artillery reserves for some years, but on this occasion they came into much closer contact with the actual details in all phases of harbor defense than ever before. Although the duties at the guns and the armament itself had been taught them they handled on this occasion for the first time the instruments for ranging, plotting, and predicting as well as those used for communicating data throughout the fire-control system.

The work with all the instruments, with the possible exception of the telephones, was excellent and much better than it was possible to expect. A large percentage of the enlisted personnel of which this corps is composed are men of education and many of them skilled in scientific pursuits. They are, therefore, especially well equipped to undertake the peculiarly trying and difficult duties required by our system of fire control. Under the restrictions of a week's instruction and practice in each year progress in efficiency must of necessity be very slow, but because of the high qualifications of many of these men, their previous experience as coast-artillery reserve, and their unflagging interest, they are capable, in my opinion, of acquiring high efficiency after a few months careful and thorough work and would become a most valuable aid to regular garrisons as an artillery reserve. Of the commissioned personnel, they showed a zeal and earnestness and a quickness and aptitude which were most gratifying to regular officers instructing them, and the State of Massachusetts can place confidence in their ability, their increasing efforts to learn the duties of coast defense, and in their earnest endeavor to fit themselves as an artillery reserve on which the State and country can rely in any hostile attempt against the artillery district of Boston.

This report would be by no means complete without a recognition of the excellent work done by the mine command at Fort Strong. This was exclusively in the hands of officers and men of the Regular Army under the command of Capt. Samuel A. Kephart, Coast Artillery Corps, commanding the One hundred and twentieth Company, Coast Artillery Corps.

The material of this mine command was in perfect condition, the training of the men most thorough, and the work of the various parts, including the powerhouse, casemate, plotting room, observation and communicating apparatus, mine field defense battery and searchlight, was harmonious, clock like and startlingly accurate. This mine command was operated in every phase in which the handling of the searchlight, rapid fire battery, and casemate showed ripe judgment and thorough tactical knowledge on the part of the mine command.

The officers and men of the regular garrison at Fort Strong were tireless in their interest in the work of the week and in their efforts to aid and instruct the militia.

The work accomplished by the infantry companies acting as supports was necessarily of a restricted character. The company officers entered enthusiastically into their work and expressed themselves as much pleased with the nature of their duties.

The infantry officers of the Army detailed to assist the artillery supports were untiring in their efforts, which were met by a cheerful and eager acceptance by the militia. Many valuable lessons in the tactical use of their arm, in guard duty, and field engineering were imparted to the militia officers, who expressed themselves as highly appreciative of the kindly suggestions and soldierly accomplishments of our infantry instructors.

Lectures were given each day by both artillery and infantry officers on a wide range of professional topics.

[Capt. J. F. HOWELL, Coast Artillery Corps, adjutant, artillery district of Boston.]

I visited each post in the district several times and made a particular point of learning from individual officers their opinion of this joint tour of duty with the Regular Coast Artillery as compared with their usual annual State encampment, and without exception officers in all grades, both artillery and infantry, expressed themselves unhesitatingly and with evident sincerity as preferring the present form of encampment.

The definite object in view appealed to them and the instruction given in both branches was in all cases commented upon favorably.

[Capt. H. D. TODD, jr., Coast Artillery Corps, artillery district engineer, artillery district of Boston.]

The good results of the practice directed by the district commander several weeks before the exercises, were evident.

While the submarine cables did away with the necessity of relying upon the heliograph and acetylene lantern the signal details at the different posts established and maintained interpost communication in a very efficient manner.

Mortars for firing signal shells and Very pistols were procured on requisition, with the necessary ammunition, and used as prescribed in Signal Memorandum No. 1.

In some instances militiamen acted as assistants to the fireman and it is recommended that the corps of coast artillery, Massachusetts Volunteer Militia, be encouraged to enlist more men capable of rendering assistance at power plants and searchlights.

[Capt. LOUIS E. BENNETT, Coast Artillery Corps, in charge of office of quartermaster, artillery district of Boston.]

Early in June a meeting of the post quartermasters, at which all were present, was held at Fort Warren and the plans of the kitchens, mess shacks and latrines for each post were agreed upon and submitted to the district commander for approval. At this meeting the requisitions for camp equipage, straw and fuel were gone over and decided upon, together with the question of lighting. The camp sites had been selected by the post commanders and blueprints of some submitted planning location of bath houses and the piping of water to same and to kitchens.

In case of future exercises of this nature I would recommend an officer be detailed to take charge of quartermaster steamers, accompanying them from district to district, receipting for the property thereon, making arrangements for subsistence and pay of the crews, these boats having no galleys on them, and to be responsible for the carrying out of whatever orders may be given the boats.

[Capt. LOUIS E. BENNETT, Coast Artillery Corps, quartermaster, Fort Banks, Mass.]

I would recommend if these camps are to continue from year to year the camp site in rear of mortar battery at Fort Banks be filled in.

The incinerator worked very well while used only by the one company of regulars during the first week, but during the second week when it was running at full capacity and frequent burnings being made it was found it was not odorless. This can possibly be remedied by adding about 20

feet to the stack, so the fumes that arise will be carried over camp site, but would recommend change of location and also installing another incinerator near infantry camp.

[Capt. WILLIAM F. HASE, Coast Artillery Corps, commanding Seventh Company, Coast Artillery Corps, and Battery Theodore Winthrop, Fort Banks, Mass.]

The Eighth Company, Massachusetts Corps Coast Artillery, Captain Smyth, was assigned to Tact. 3 of my battery. The range section of this company had come to Fort Heath several times prior to the camp. They therefore had some idea of what was expected of them. During the first two days of the week my range section did most of the work, the Eighth Company men looking on. After that the Eighth Company did almost all of it, first under the supervision of the regular detail and then alone. The track sheet submitted herewith shows what splendid work they did. On Thursday and Friday the section worked so well together that the corrected range was sent to the battery within five seconds after the observation. I can not too highly commend the work of these men.

Recommends the militia companies be given an opportunity to fire on a moving target with subcaliber ammunition each day that they are here in camp. I think that this would lead to great interest, for every one could see individual effort make for efficiency.

The subcaliber gun can be inserted easily. Primers could be used when the enemy was in sight and drill with dummy ammunition could go on when the tubes were withdrawn.

A fact which impressed me greatly was that this company did not have a single man who could efficiently perform the duties of the breech detail. The men were short in stature and did not have the physique to translate and rotate the heavy block.

All of the officers and men were most enthusiastic and zealous—glad to receive and comply with suggestions.

[Capt. H. B. GRANT, Coast Artillery Corps, commanding Battery Benj. Lincoln, Fort Banks, Mass.]

The range detachment of the Twelfth Company, Massachusetts Corps Coast Artillery, worked very well considering the short time available for drill. It is understood that

they have no practice at their home armory. The last day they worked by themselves without coaching with very good results, except that no attempt was made at speed.

[Capt. H. D. TODD, Jr., Coast Artillery Corps, fire commander (northern battle command), Fort Heath, Mass.]

In respect to the work of the infantry I was particularly interested in seeing that they did as much work as possible upon intrenchments.

They began with the lying-down trench, enlarged this to the kneeling, and then standing trench, and then they also constructed a short parapet having one-fourth size of a fieldwork with a normal profile.

It was first supposed that the infantry officers, particularly the battalion commander and his staff, would desire to participate to a large extent in ceremonies, as parade, escort of the colors, etc.

Such, however, was not the case. They wanted to learn and practice things they were not familiar with, and their programme was arranged accordingly.

SUBCALIBER PRACTICE.

This the militia took great interest in and desired to have more than it was practicable to give them.

They were particularly disappointed that, owing to fog, it was impossible for them to get this practice at a moving target.

I have come to the conclusion that this practice is beneficial for them, the only drawback being the difficulty in procuring the necessary tugs and targets in a district with so many different forts.

In general, the exercises undoubtedly did the militia a great deal of good, especially along lines with which they were not familiar.

The commissioned officers took hold with a certain amount of confidence, and when put entirely in charge, as they were on August 2, conducted the fire command in an efficient manner.

[Capt. SAMUEL A. KEPHART, Coast Artillery Corps, mine commander, Fort Strong, Mass.]

Though 50 per cent of the result may be summed up in enthusiasm it was very satisfactory to witness the zeal of the

volunteers. Having obtained a bird's-eye view of coast-defense warfare, the succeeding steps should be working up keenness in the use of the telephone and telautograph, etc., and in rounding out practice work.

Too much "call to arms" is not a good thing.

Service target practice should be led up to for them.

A company should be assigned to the mine command, and that, with the torpedo company, should be used exclusively for submarine instruction. With reasonable preparation 3 mines on land could be "laid," and on water 7 planted on a 7-core cable under the new system.

The details (submarine mine) were irregular in attendance and few came, because most of them were taken for details elsewhere. In the training of volunteers the organizations will return undoubtedly from year to year to the commands assigned in these exercises, but it is very doubtful that the "selected men" will return to this command from year to year.

An organization definitely assigned will imbibe and retain the ideas of the work though its personnel change somewhat. While the policy of the War Department may be that the mine command shall be operated by regular companies, there will always be in every district help needed to accomplish the work of preparing and planting mines—that is, doing a great deal of work in a comparatively short space of time—and such help should be of the qualified kind.

The volunteer companies should have a sufficient amount of work to whet their interest, but I doubt that simply drilling at and manning 3-inch guns is a fair return for the time spent here.

It is recommended that the definite organization of a torpedo company, Massachusetts Volunteer Militia, be brought to the attention of the proper State officers or that one of the companies be designated for this important work.

Of the results developed none are more prominent than the value of the cooperation of the volunteers in coast-defense work; of the necessity of solving the searchlight question, and of the evidence of poor telephone work generally.

[Capt. CHARLES R. LLOYD, Sixth Field Artillery, fire commander, Fort Strong, Mass.]

I wish to state that the behavior of the militia was excellent, not one case requiring any punishment coming to my notice.

In future camps of this kind I believe it would be better to devote the first three days entirely to drills and instruction without having any other exercises.

The present strength of militia artillery companies is too small, and I recommend that it be increased to equal the strength of the regular establishment.

Throughout the entire week there was no lack of interest shown on the part of any of the State troops, and the facility with which they picked up their duties proved that they would be of great value in time of war.

In conclusion, I wish to state that I think the maneuvers were most beneficial to all concerned and so far as I saw everyone who took part in them was well satisfied with the general result.

[Capt. PHILIP YOST, Coast Artillery Corps, commanding Forty-sixth Company Coast Artillery Corps, Fort Strong, Mass.]

With the exception of Wednesday night, July 31, B' stations of batteries Ward and Hitchcock were manned by militia details. During drills the Forty-sixth Company, Coast Artillery Corps, detail gave such instruction and assistance as was necessary.

The progress made by both militia companies was exceptionally satisfactory, considering the ground covered and the limited time available. More time for individual and battery instruction should be given before phase work is given. A proficient noncommissioned officer should be with each piece manned by a militia company to look after the care and preservation of piece and accessories.

[Capt. E. J. WALLACE, Coast Artillery Corps, fire commander, Fort Warren, Mass.]

As regards the militia the discipline was good, the physique of the men as a whole was fair, and their intelligence was much above the average. Their instruction in artillery matters was of necessity slight and superficial, but was supplemented by a very great eagerness to learn.

As regards the industry, earnestness, and intelligence of the Massachusetts Volunteer Militia artillery reserve, too much can not be said in their praise. As an auxiliary to a nucleus of well-instructed regular artillery troops it can reasonably be expected that they would render fairly efficient service within one week after entering the garrison and would thereafter increase daily in value. On the other hand, it is doubtful if these troops would be of any utility as independent garrisons within six months.

Their weakness consists in unfamiliarity with details of artillery work and the material which they are called upon to use.

To obviate this in so far as is possible I would most earnestly recommend that there be issued to each ten companies of militia artillery reserves one complete equipment B' and B'' stations, except telautograph, together with two azimuth instruments and two telescopic sights with Hagood brackets.

No expenditure of money of which I can conceive will give greater increased efficiency for dollar expended than will that used for the above-mentioned purpose.

In general, if it were possible to permanently assign all artillery reserve companies to the batteries and guns which they would be expected to man in case of hostilities and all infantry supports to the posts where their services would be required greatly increased efficiency would be obtained.

Attention is also invited to the fact that during the recent exercises it was not possible, with both regular and militia troops, to man completely with one relief one-half of the armament installed and proposed. It is therefore evident that the artillery reserve should be doubled.

[Capt. F. W. STOPFORD, Coast Artillery Corps, commanding Battery Stevenson, Fort Warren, Mass.]

Battery Stevenson * * * was manned by Ninety-sixth Company, Coast Artillery Corps, at No. 1 gun, myself in command; No. 2 gun by Eleventh Company, Corps Coast Artillery, Massachusetts Volunteer Militia, Capt. F. L. Whiting in command.

A complete range section was furnished by each company.

The work as laid down was followed, and in addition much time was spent in giving instruction in nomenclature and

functioning of the various parts of the gun carriage range finder.

I wish to acknowledge my appreciation of the good discipline of this company and the remarkable desire on the part of all the men to learn everything put before them concerning the artillery work. The result was that the militia range section handled the position finding during phase III, attack on Broad Sound, satisfactorily.

A regular gun commander was detailed for service at the gun manned by this company and was constantly in attendance. This supervision was of great value to the militia as it gave them confidence.

The behavior of the men in camp was excellent, there being no disturbance of any kind.

Owing to the interest and enthusiasm displayed by the militia troops I earnestly recommend the detail of some officer, on duty in the district, as instructor of this regiment in their armory, who can lay out a comprehensive and progressive course of instruction and lay all matters pertaining to their use of armament in the district before the district commander.

[Capt. ADNA G. CLARKE, Coast Artillery Corps, commanding Battery Bartlett, Fort Warren, Mass.]

The first and fourth companies, Corps Coast Artillery, Massachusetts Volunteer Militia, attached to Battery Bartlett, deserve to be highly commended for their appearance, discipline, and efficiency. When it is remembered how little they have had to do with, it is really remarkable that they should have proven such good artillery reserves.

The First Company, Captain Frothingham's range section, was especially efficient. This range section has visited Fort Warren every alternate Sunday since the company was assigned to Battery Bartlett and was, therefore, in excellent condition to begin the serious work of the week.

The work of both companies at the guns was highly satisfactory.

It is believed that the Corps Coast Artillery of the Massachusetts Volunteer Militia will make excellent artillery reserves if furnished the necessary equipment by the Federal Government. It would be entirely practicable to equip their

armory in Boston with the complete position-finding equipment except depression position finders and telautographs. Base end stations equipped with azimuth instruments, time interval bells, and telephones could be established on either side of the harbor and vessel tracking practiced as a part of every drill. Fort Independence could be used as one station and could doubtless be obtained without expense. These stations should be easy of access by street car so that the details could get to their stations without loss of time. The other station might be across the harbor at Fort Winthrop, the base line being about 1,800 yards long, exactly across the channel, and there would always be moving targets in view. Fort Winthrop being on an island might not be sufficiently easy of access.

The men were very zealous in their endeavors to acquire knowledge and were especially anxious to qualify themselves for the gunners' examination. I believe that if they could be supplied with the range-finding equipment, azimuth instruments, Scott sights, and Hagood mounts, their desire to qualify as gunners would furnish sufficient incentive to maintain the very great interest in artillery work which they have shown.

[Capt. H. T. MATTHEWS, Coast Artillery Corps, commanding fire command No. 4 (southern battle command), Fort Andrews, Mass.]

The reserves proved their worth and that they can be, with proper encouragement, developed into a valuable force. The men of the reserves whose duty required only mechanical skill soon acquired a fair knowledge of their duties and seemed to take great interest therein and their service of the piece was quite creditable on the last day.

The gun pointers, trainers, and gun commanders were somewhat slower in gaining confidence in themselves but soon acquired considerable skill and accuracy in their duties. Both officers and men of the reserves showed the greatest interest in their duties and the time was all too short for the work they desired to do. The officers all displayed commendable zeal and great intelligence in the performance of the various and unfamiliar duties required of them. The target practice by reserves was very creditable, especially as

it was the first time that a moving target had ever been fired at by them.

The greater part of the instruction of the reserves should, after the first few days, be along the lines of subcaliber practice and should, if possible, be ended by target practice with full service charges by all companies that show the proficiency, as a keen rivalry exists among the companies of the reserve force as to which shall be considered the most efficient. If companies of reserves could be assigned either permanently to a battery, or assigned annually and notified early in the season, it is thought that great progress would be made as gun commanders, pointer, and range keepers, etc., would specialize and endeavor to become familiar with the duties which they are to perform before coming to camp, and would doubtless visit their battery many times during the year and would feel free to ask assistance of the officers and noncommissioned officers with whom they are associated. Many officers and men of the reserves expressed a desire to be present at the target practice of the regular companies and if permission could be granted them to do so and they could be notified beforehand it is thought that the efficiency of the reserves would be increased. If some of the more simple appliances for finding ranges and deflections, such as azimuth instruments and wooden model of sights used, could be furnished the reserves for use at their armories they would come to these camps more fully prepared to perform their true functions as an auxiliary fighting force of the coast artillery.

[Capt. F. S. LONG, Coast Artillery Corps, battery commander, battery Cushing, Fort Andrews, Mass.]

The practicability of associating the State troops with regular troops was, in my opinion, shown to be entirely feasible.

I desire to invite attention to a matter of vital importance in this connection. Each company of State troops assigned to the batteries should remain at the same battery for a period of years so that new problems will not be constantly presenting themselves with limited time, and with almost no equipment at the armories it is too much to expect of State troops that they can keep posted on all guns in the

service. If a plan could be formulated this winter whereby all instruction given each company should be confined to a single type or battery of guns much energy would be conserved.

Further, if regular army instructors could be given short tours of duty with these troops and, working with the company commander, eliminate any obsolete methods and direct study and instruction into the correct channels, the results would be beneficial.

While the regular troops with their intimate acquaintance of details are the basis for our coast defense, the enthusiasm and desire for knowledge on the part of the State troops is such as to make them, under proper instruction, a valuable acquisition in event of war.

I am convinced that, with a few possible exceptions, the regular troops may expect little aid at present from the State troops in working out the details of coast defense, but the enthusiasm of the State troops render them capable of rapidly absorbing any methods that the regulars provide.

During the week many lectures on material and accessories were given, and here again the desirability of having State troops permanently assigned to batteries was shown.

The Tenth Company, Corps Coast Artillery, Massachusetts Volunteer Militia, seemed to forget that there were any other defenses than mortars, scarcely a question being raised on any other subject.

I have had acquaintance with State troops since 1886 in four different States, but I am of the opinion that the Tenth Company, Massachusetts Corps Coast Artillery, both officers and men, is the best material for United States service that I have ever met, in intelligence, discipline, and effectiveness.

RECOMMENDATIONS.

1. That a joint board of officers, both State and regular services, be convened to outline a plan of instruction for the State troops this winter and provide material for use at State armories.
2. That officers be detailed from time to time to superintend instruction at armories.

3. That companies be assigned permanently to a battery of guns and be allowed to visit their batteries whenever feasible.

4. That the camping of regulars and State troops together, as they were this year, be continued.

5. That the State troops be supplied with ordnance pamphlets, artillery circulars, and orders affecting the type of guns to which assigned.

6. That next year they be allowed at least three rounds of service ammunition in addition to subcaliber ammunition.

7. That a course of study similar to our post school for officers be prepared for their study at their armories, thereby imparting theoretical as well as practical knowledge.

At the conclusion of the course that as many officers of the Massachusetts Corps Coast Artillery as can be assembled be taken to one of the harbor forts and witness the triangulation work in establishing a base line and given a practical illustration of orienting a gun.

8. That two searchlights be installed, one on each hill.

[Capt. HENRY C. MERRIAM, Coast Artillery Corps, commanding Eighty-third Company, Coast Artillery Corps, Fort Revere, Mass.]

The range details of the militia were slow and did not get accurate data, as there were sudden changes in deflections and range which were impossible during one prediction interval.

The service of the piece was very well performed, and I am of the opinion that if the range details could have more practice these militia companies of the Corps of Coast Artillery of Massachusetts would be able to give very good service in time of need; but that the time and practice necessary to train the range details is more than they can get at a one-week encampment, and that if some arrangement could be made to have these details visit posts in the harbor once a month, or some such regular period, for practice at this work, it would be of great benefit to the Corps of Coast Artillery of Massachusetts.

All of this Corps on duty at this post showed an interest in their work and if given the opportunity I am sure will take advantage of any privilege which can be shown them for their instruction.

If it can be arranged, I would suggest that a regular officer be detailed by proper authority to give regular instructions in the armories of this Corps on subjects pertaining to the artillery work of the militia, and that he be furnished with the necessary boards and instruments for this purpose, which could be issued on memorandum to the regular officer detailed for this work and which could be kept at the armory under charge of the regular officer.

[Capt. F. K. FERGUSON, Coast Artillery Corps, commanding U. S. torpedo planter *Colonel Geo. Armistead*.]

One thing of importance illustrated by the maneuvers was the inadequacy of the searchlight equipment in Boston Harbor. Had the number of vessels in the attacking fleet been greater the deficiency of the existing equipment would have shown up very conspicuously.

[Capt. G. T. PATTERSON, Coast Artillery Corps, commanding U. S. torpedo planter *Major Samuel Ringgold*.]

The most important thing brought out by these maneuvers is the great need of searchlights in this harbor and the necessity of thorough training in their use.

[First Lieut. FRANC LECOCQ, Coast Artillery Corps, emplacement officer, attached to Eighty-ninth Company, Coast Artillery Corps, Fort Banks, Mass.]

From my observation I believe the encampment was of great benefit, as it accustomed the personnel to caring for themselves under camping conditions, each day showing some new idea grasped by the men and their adoption of it to the outdoor situation. The general health of the men was excellent, due to the careful preparation of the camp; the sanitary, messing, lighting, and, in fact, the entire arrangement of the camp was excellent and largely contributed to the success of the encampment.

[First Lieut. FRANCIS M. HINKLE, Coast Artillery Corps, battery officer, Battery Bartlett, Fort Warren, Mass.]

The militia troops were handicapped the first two or three drills by the large number of recruits in the gun detachments. The men were interested and rapidly picked up the drill, so that the last two or three days the work was most creditable.

[First Lieut. F. H. LOMAX, Coast Artillery Corps, battery commander, Battery McCook, ordnance officer and post quartermaster, Fort Andrews, Mass.]

The discipline and behavior of the militia was excellent. I believe they derived great benefit from these exercises and proved conclusively that they could be depended upon as the reserve in active service.

The manner in which State and organization property was handled should receive serious consideration in the future. Property responsibility is a thing that volunteer officers find hard to understand and yet it is the first thing that will get them into trouble if mustered into the regular service.

Apparently there was no proper system of responsibility and accountability of State and organization property while en route to and from these camps or while in use.

No attempt was made by anyone interested to properly invoice or obtain receipts for same. Organization property was never marked, and that of the State very poorly, when received at posts, and when turned over (or rather left on the ground) for reshipment no attempt was made to properly mark the same. State and organization property was mixed up, tents were not rolled properly and put in the same condition as when received, tent pegs were in many cases left lying around loose, and I know of some cases where tent floors, State property, had been cut up for firewood.

Under such conditions it was impossible to check up, properly distribute, and return same to its proper destination without error, and if no loss results it is due entirely to good fortune and the many trying hours spent by the quartermaster and his subordinates in trying to straighten things out.

To remedy this I would recommend that in the future, previous to exercises or camps, all militia quartermasters concerned be assembled together for instructions in property responsibility and accountability and our system of invoicing and shipping and means and methods of getting property to and from the camp and caring for it when there be thoroughly discussed, and that quartermasters and organization commanders thoroughly understand their duties in this matter.

[First Lieut. G. A. TAYLOR, Coast Artillery Corps, communication officer, southern battle command, Fort Warren, Mass.]

In regard to the work of the artillery reserves in the station I would say that it was all that could have been expected. On the afternoon of Friday, they handled the Swasey depression position finder and battle commander's chart with considerable skill. I would recommend that in some way depression position finder instruments be available for the training of observers during the year so that the various adjustments of the instrument can be taken up during the year by officers and men. In their armories, also, much could be done in training telephone operators in transmitting messages and certain prescribed commands.

[First Lieut. R. P. WINSLOW, Coast Artillery Corps, emplacement officer, Battery Cushing, Fort Andrews, Mass.]

I found the militia officers and men to be very enthusiastic and anxious to learn as much as possible concerning the science of artillery. They had studied the service of the piece before they arrived and it only required a short time for them to become almost as efficient in the handling of the guns as the regular detachments were. Notwithstanding the fact that the hours of drill were long and exhausting the men were always anxious to listen to explanations and lectures and they were continually asking for information.

The tour of duty with the militia has proven conclusively, in my opinion, that in so far as the service of the guns is concerned it is perfectly feasible to train gun detachments to a high state of efficiency in a relatively short time, and in case of need the artillery reserve could safely be intrusted with that duty provided the range sections are taken from the regular garrison.

Lieutenants Sampson and Edson, Corps Coast Artillery, Massachusetts Volunteer Militia, were alternate emplacement officers and performed their duties in a very efficient manner.

[First Lieut. W. A. BALLARD, JR., Coast Artillery Corps, communication officer, fire command No. 4, Fort Andrews, Mass.]

The discipline and behavior of the militiamen with whom I came in contact was excellent. Although many of them had had previous training and instructions in artillery work they undoubtedly derived great benefit from these joint exer-

cises and proved conclusively that with a little training they could take entire charge of the guns and stations and man them satisfactorily.

One of the principal things I noticed was the harmonious working together of the regulars and the militia and the cordial and friendly relations existing between them at all times.

The regular soldiers seemed to take a pleasure in instructing and helping the militia all they could and the latter were eager to learn. Such relations between the regulars and the militia are not only gratifying to the officers, but in case of actual service where the two are combined in one command would, of course, be conducive to good and efficient work and would prove to be for the best interests of the service. I would respectfully suggest that in the future each company of coast artillery militia be notified at least one month ahead of time just what caliber guns they are to man during the exercises and that their gun pointers and such others as desire to do so be allowed to come to the artillery forts before the exercises and familiarize themselves with the sight and the piece which they are to man. Their armories should be furnished by the National Government with models of the sight, the plotting board, and other instruments used in range towers. Judging from the enthusiasm and efficiency shown by the militia with whom I was associated their efficiency would be greatly increased were they furnished with more material and devices with which to carry on the instruction in their armories.

The militia companies with which I was associated deserve great credit for their esprit de corps, the hearty interest which they take in their work, and the good work which they did, both at the guns and in the range towers, during the exercises. I would also recommend that the militia officers and noncommissioned officers be notified when the service target practice by the regulars takes place and be invited to witness same.

[First Lieut. H. U. TOMPKINS, Coast Artillery Corps, commanding quartermaster steamer *Norrison*.]

The insufficient number and power of searchlights at Forts Warren and Revere is very evident.

[Sanitary officer JAMES K. STOCKARD, post surgeon, Fort Revere, Mass.]

The latrine and urinal troughs installed in the militia camp worked very satisfactorily. Under the personal supervision of a member of the sanitary squad these troughs were flushed hourly. As a result everything in the latrines was kept clean and entirely free from bad odors. Men after using the latrines were often tempted to flush the troughs themselves but as they did not do this thoroughly the effort resulted in more harm than good and I would suggest that some means be provided by which the troughs could not be flushed by anyone except the man on duty for that purpose.

I was much pleased with the high standard of militia bearing and moral deportment of the soldier body during the entire encampment. After a close and critical daily observance of their conduct during this period I did not see a single case of drunkenness or an ungentlemanly act committed. The moral tone of the whole organization was praiseworthy and commendable.

[Contract Surgeon LUKE B. PICK, U. S. Army, Fort Andrews, Mass.]

Camp Site.—Excellently located; surface drainage good; well policed and all tents ditched.

Kitchens.—Well planned and constructed. The store room for food should be better built and the doors and windows fitted with mosquito netting to exclude flies. This room should be used only for the storing of subsistence stores and cooks ordered not to use it as a sleeping and dressing room, which was the case among the militia companies.

Discipline.—The habits of the men were excellent, no drunkenness or disorderly conduct occurred among any of the organizations.

[Contract Surgeon ERNEST F. SLATER, U. S. Army, Fort Banks, Mass.]

At Fort Banks, Mass., owing to the compactness of the camp and the close proximity to the regular company barracks, the arrangements as to the use of toilets in the company barracks by the men was entirely satisfactory. At Fort Heath, as to the McCall incinerator used by the companies encamped there, it appeared to be entirely satisfactory and

admirably served the purpose for which intended. On one of the first days of the encampment a representative of the maker of the incinerator appeared to demonstrate the general working of same, but after one day of his work it was clearly apparent that he knew very little pertaining thereto. I then looked into the matter and instructed the man in charge as to its use and for the remaining days of the encampment the incinerator appeared to work entirely satisfactory.

These incinerators in the hands of a person who does not understand their manipulation may give very unsatisfactory results and is probably the cause of some of the unfavorable reports made thereon.

The sanitary condition of the camps and surroundings were excellent. Thorough daily systematic inspections of the camps were made by me, and any infractions were promptly remedied in both the regular and militia camps. The militia organizations on duty here appeared to be far above the average of such organizations in general sanitary matters and of policing of camp sites. On the first day in camp of the militia I took the two surgeons attached thereto on an inspection tour of both Fort Banks and Fort Heath and thoroughly explained everything pertaining to sanitation of the two camps, and during the remaining days of the encampment they used every effort and means to keep the camp sites of their organizations in thorough condition. The First Lieutenant and Assistant Surgeon, Massachusetts Volunteer Militia, was on his first active tour of duty with his organization and can not be praised too highly for the efforts he used in keeping the camp sites of the two companies to which he was assigned in excellent condition.

Bathing arrangements in the two camps were ample and arrangements for the removal of garbage, dishwater, etc., were good and properly attended to.

The habits and behavior of the men were excellent.

[Contract Surgeon E. S. TENNEY, U. S. Army, Fort Strong, Mass.]

The McCall incinerators worked, I think, to the perfect satisfaction of all concerned, and appear to be by far the best method of disposal of urine and fecal discharges yet

tried for a camp of this nature. There was absolutely no odor outside the buildings, and very seldom could an odor be detected inside. Some few of the militia failed to properly make use of them, but this can not be said of many. One or two days when there was a strong west wind and incinerators were burned out during the late afternoon the smoke from the stacks blew through the kitchens and mess tents and was complained of by the cooks.

During the first few days the cooks of the militia companies failed to appreciate the necessity of properly disposing of garbage and waste from the tables, and their company officers were not quite so strict as they might have been in keeping the grounds to the rear of their kitchens properly policed; however, there was no gross neglect.

The means of disposal of garbage was satisfactory.

The general behavior and habits of all the men was excellent.

During the entire encampment I saw no drunkenness or evidence of drinking.

INSTRUCTORS OF SUPPORTS.

[Capt. FRANK S. COCHEU, Twelfth Infantry, U. S. Army, Fort Banks, Mass.]

So far as the week's work is concerned future exercises will be more instructive and profitable if companies taking part in them arrive in camp with their officers and noncommissioned officers thoroughly grounded in at least the theory of patrol duty, road sketching, and hasty intrenchments, so that after a comparatively few hours spent in practical work in these subjects instruction can proceed in advance guard and outpost work.

[Capt. A. T. OVERSHINE, Seventh Infantry, U. S. Army, Fort Strong, Mass.]

Maj. Francis Meredith, jr., commanded the militia companies of infantry. He, as well as his officers, manifested great interest and zeal. They were always ready to accept suggestions and assist in every way possible that the work might proceed smoothly. The same interest and zeal was manifested among the enlisted men.

I believe that the infantry companies were benefited by their work at Fort Strong, but I believe better work could

have been done elsewhere. The ground was too small for practical field problems, there was no place where actual digging could be done for trenches, etc.

[Capt. P. E. M. WALKER, Twelfth Infantry, U. S. Army, Fort Strong, Mass.]

During these exercises the officers and enlisted men of the Fifth Massachusetts Infantry have at all times, and without an exception, displayed the most commendable energy, interest, and enthusiasm, paying the closest attention to all instruction given them and the greatest willingness to adopt all suggestions tending to their improvement.

[Capt. ALFRED T. SMITH, Twelfth Infantry, U. S. Army, Fort Warren, Mass.]

The company with which I was on duty proved far above the average militia organization in discipline and instruction.

No recommendations are offered looking to improvements in future exercises, but to further instruction of these supports they should be assigned to different harbor forts in the district each year to have the additional advantage of terrain in the case of forts which afford greater ground space for exercises.

[Capt. MATTHEW E. HANNA, Third Cavalry, U. S. Army, Fort Andrews, Mass.]

The militia officers have uniformly expressed the opinion that this has been the most instructive encampment they have ever attended. Officers and enlisted men alike manifested the greatest enthusiasm throughout the week and the progress made in their instruction was marked from day to day. They were eager to learn minutiae of camp field service and their interest never lagged. The evening conferences were fully attended, even by men who were not required to be present. They were without exception, so far as I observed, a body of intelligent men, conscious of their limitations and eager to learn. Such shortcomings as they showed were due to ignorance and never to neglect. The same careful duty, etc., was demanded of them as would be required of regulars. The more they were required to do and the greater the exactness with which they were required to do it the more delighted they seemed to be. It is needless to say that there was the best of feeling between the regular officers and the militia command.

The work of the troops in the field during the solution of the tactical problems was very commendable. They played the game of war with as great or greater interest than regulars. In this work the limitations of the officers were more apparent than those of the men. Every problem that was solved furnished at least one illustration of the faulty ideas that are gotten from the "normal formation" of the drill regulations. Outposts, advance and rear guard, attacks, etc., were formed to agree with a diagram in the drill book rather than with the demands of the ground. There is need in the militia for a book, such as Griepenkerl's *Applied Tactics*, to offset the erroneous ideas formed from reading the drill regulations only.

Personally, this service with militia has been of the greatest value to me, of such great value that I am of the opinion that a more intimate knowledge of the militia by regular officers in general would be decidedly for the best interest of the service.

[Capt. H. E. EAMES, Tenth Infantry, U. S. Army, Fort Andrews, Mass.]

The work of the militia officers and men was excellent and deserving of commendation. Tactical mistakes were, of course, made and were corrected on the ground and in the discussions which followed.

[Capt. W. BIRNIE, Jr., Sixth Field Artillery, Fort Revere, Mass.]

Drill and instruction.—The 1st Battalion, Massachusetts Volunteer Militia, showed that it had been thoroughly schooled, theoretically, in the school of the company and battalion, close and extended order, in security and information, guard duty, and in minor tactics. The knowledge possessed by its officers in these subjects gave evidence of much study and zealous application. Practically it had been drilled in the school of the company, and instructed in guard duty and security and information to the extent possible in its armories.

The practical battalion and company administration of the camp was most excellent. The police of camp was beyond criticism, the ration efficiently handled by regularly enlisted cooks, and officers and men showed a degree of facility in caring for and making themselves comfortable in camp which

would ordinarily come from more field experience than this battalion has had. Officers and men were alike zealous and enthusiastic in carrying out the work in hand and eager and interested in learning that which was new to them.

This is the first opportunity I have had to observe the work of the militia, and I was impressed with the idea that there was little wanting in material and enthusiasm but only in systematic instruction to make it a powerful national reserve.

[First Lieut. A. C. KNOWLES, Thirteenth Infantry, U. S. Army, Fort Banks, Mass.]

In view of the limited time during which the militia organizations take part in field exercises and considering the many and varied classes of duty prescribed for their instruction it is considered desirable that the officers, by all means, and the noncommissioned officers, where practicable, meet in lyceum during the period of their indoor drill season for the purpose of studying and discussing the following subjects: The service of security and information; manual of guard duty; infantry drill regulations; military engineering, and topography (map reading, making, etc.) as a necessary preparatory training to instruction in actual field work.

The work of the officers and men as a whole was satisfactory. They did considerable hard work and, so far as I could notice, performed their duties in an energetic manner. Some of the officers impressed me with their sincere desire to make the most of the encampment, to advance themselves in the knowledge of military matters, and were tireless in their efforts to profit by the experience and assistance afforded them.

[First Lieut. BERNARD SHARP, Third Infantry, U. S. Army, Fort Strong, Mass.]

The officers and men of the militia are intelligent and in earnest. They are reasonably proficient in close order drill but know very little of the duties of infantry in the field.

[First Lieut. CHARLES C. FINCH, Twelfth Infantry, U. S. Army, Fort Andrews, Mass.]

The companies were extremely enthusiastic in their desire to become proficient. Expressions were heard on all sides of their appreciation of the opportunity afforded to acquire

a more extended knowledge of the military profession. After having attended the maneuvers at Camp Roosevelt, Mt. Gretna, Pa., last summer and the present small camp of instruction here, I am of the opinion that camps of militia by battalion under instructors from the Regular Army are more beneficial to the company officers and enlisted men than the larger camps of instruction, where the company officers and enlisted men do not, as a rule, sufficiently understand the problems being worked out and by reason of this erroneous ideas are formed and carried away.

[First Lieut. M. E. LOCKE, First Field Artillery, Fort Revere, Mass.]

The continuance of these exercises in the future ought to be of profit to the militia infantry taking part therein. Many of the militiamen are office men, clerks, accountants, etc. The first and the last of the month are particularly busy times for them and if in the future these exercises were ordered to take place in the middle of the month a better attendance of the militia might be secured and those taking part could give their undistracted attention to the work of these exercises. The militia at this post, Fort Revere, Companies L, A, G, and E, Fifth Massachusetts Infantry, Massachusetts Volunteer Militia, have showed great zeal and an eager desire to profit by the instruction afforded them. The faults that I found were such as must of necessity exist among any troops quartered in isolated company armories and having but very little time for drill and instruction. These troops especially require more drill in extended order and the officers would be greatly benefited by a course (brief) in minor tactics. As far as possible the instructors at this post have endeavored to outline the work with this end in view during these exercises. The readiness with which this battalion accepted every opportunity to receive instruction shows the efforts of the Government to provide them with it have not been wasted.

COMMENTS OF MILITIA OFFICERS.

[Col. CHARLES P. NUTTER, commanding Corps Coast Artillery, Massachusetts Volunteer Militia.]

The health of the command was excellent throughout the tour of duty, there being only a few minor troubles which

yielded readily to treatment. Much of this was due to the splendid sanitary conditions that prevailed at each post. The incinerators used were very good, but care must be exercised in their location as was evident at Fort Heath where the incinerator was located at the lowest level on the reservation and the camp on the higher ground, nearly level with top of stack, thus when the waste material was burned much of the time the fumes from stack blew through the camp, and while they may not be deleterious in their effects they are certainly obnoxious and to be avoided. This could be obviated by using a taller stack, changing location, or using the water flushed sinks as employed at some of the other posts.

The transportation furnished for troops and impedimenta was ample, although larger transports could be used to good advantage. I would suggest an interchange of receipts and volunteer service where they are required to handle property in the discharge of their duties. I do not wish to criticise any officer, but I feel that had this been the practice this year some trouble and annoyance would have been avoided. Either this or authority to handle our own property or suitable storehouses at each post where our State property could be stored.

During the tour I visited all the companies of my command and inspected their quarters and the men at drill. I found officers and men of the command at their work with an earnest zeal that pleased me without surprising, as I well knew their desires in regard to artillery duty. The first part of the week was devoted to practice drills and the latter to phases and I am convinced that there should be fewer phases and more practice drills or a longer tour of duty, as time is too limited for men to acquire proficiency in drill. Guard details were necessarily small and at some posts they were omitted entirely. From my view point this omission was wrong, it being the only good opportunity we have for men of the Corps to acquire customs through actual contact. The subcaliber practice had during the tour was of great benefit but should be followed with target practice with the big guns. The amount of interest created more than offsets the cost.

The omission of ceremonies I much regret, as I am convinced that the friendly rivalry created works to the benefit

of both the regular and volunteer service. During this tour of duty I was impressed with the amount of unnecessary work the coast artillery supports were caused by the sounding of "To Arms" when they were not needed for an hour or more after the coast artillery had been called, and I would suggest that a designating call for the Coast Artillery Corps be used as a prefix to the regular call or a new call having the same stirring finale of the regular "To Arms."

Friday morning, August 2, at the request of the District Commander, Lieutenant-Colonel Homer, I visited Fort Warren, arriving there about 12 M., having been delayed by a heavy fog that enveloped the harbor. Shortly after my arrival Lieutenant-Colonel Homer, much to my surprise and delight, turned over the tactical command of the district to me for the fourth phase, a report of which is appended here together with orders and records issued and made.

FORT WARREN, August 2, 1907.

BATTLE COMMANDERS,

Fort Warren, Fort Strong:

By authority of the commanding officer artillery district of Boston, I hereby assume tactical command of the district. Notify your fire commanders.

CHARLES P. NUTTER,

Colonel, Corps Coast Artillery.

D. & R. (delivered and received) 1 p. m.

FORT WARREN, August 2, 1907.

BATTLE COMMANDERS,

Fort Warren, Fort Strong:

By direction of the district commander the next phase will commence at 2 p. m. You will notify your fire commanders.

By order of Colonel Nutter:

E. DWIGHT FULLERTON,

Captain and Adjutant, Corps Coast Artillery.

D. & R., 1.10 p. m.

FORT WARREN, August 2, 1907.

BATTLE COMMANDERS,

Fort Warren, Fort Strong:

From information received from scout boats a general attack on defenses following operations against mine fields and attacks from landing parties is anticipated this afternoon.

Careful preparation and observation is enjoined.

Mortars have been landed and temporarily emplaced on Outer Brewster.

By order of Colonel Nutter:

E. DWIGHT FULLERTON,
Captain and Adjutant, Corps Coast Artillery.

FORT WARREN, August 2, 1907.

BATTLE COMMANDERS,

Fort Warren, Fort Strong:

All F' and B' stations will be manned at 2 p. m. and proceed to such vessel tracking as possible with view to efficiency.

Guns will not be manned until "Call to Arms," which will be sounded on first report of fleet.

When the enemy is first sighted from any observing station the fact will be immediately reported to these headquarters. Fire commanders will report to battle commander when their fire commands are ready.

In all F stations have paper superposed on plotting board and preserve the plotted course and send all to these headquarters by mail immediately after the end of the phase.

By order of Colonel Nutter:

FULLERTON, *Adjutant.*

D. & R. 1.20 p. m.

Sent to F₂, F₃, F₅ by Major Davis.

FORT WARREN, August 2, 1907.

BATTLE COMMANDERS,

Fort Warren, Fort Strong:

Report immediately the amount of ammunition in your command available for these exercises.

NUTTER, *Commanding.*

Official:

E. D. FULLERTON,

Adjutant.

Received 2.35 August, 1907.

FORT WARREN, August 2, 1907.

Battle Commander Fort Warren reports number of rounds available for exercises: Warren, 25 rounds 12-inch; 40 rounds 10-inch. Revere, 20 rounds 12-inch. Andrews, 30 rounds 6-inch; 80 rounds mortar.

WOODMAN,
Lieutenant-Colonel Commanding.

Received 2.40 p. m.

FORT STRONG, August 2, 1907.

Battle Commander Fort Strong reports number rounds available for exercises: Strong, 81 rounds 10-inch; Heath, 50 rounds 12-inch; Banks, 80 rounds mortars.

QUIMBY, Major, Commanding.

Received 2.45 p. m.

Number of phase, 4.

Nature and location of phase: A general attack on the defenses of Boston and run-by through both channels.

Time of "Call to arms:"

3.06 p. m. Northern battle command.

3.12 p. m. Forts Andrews and Revere. } Southern battle command:
3.15 p. m. Fort Warren.

3.12 p. m. Northern battle command reported "In Order."

3.21 p. m. Southern battle command reported "In Order."

3.50 p. m. Time of "Cease Firing."

4.41 p. m. "Cease Firing" close of phase.

Time and nature of orders to different commands.

2.00 p. m. Fleet left Fort Warren. In sight all the time.

3.06 p. m. "Call to Arms" northern battle command.

3.10 p. m. Infantry attack at Winthrop and enemy is being repulsed.

3.12 p. m. Andrews and Revere "Call to Arms."

Northern battle command reports "In Order."

3.12 p. m. Southern battle commander, direct all fire commanders to have all F' and B' track when within instrumental range.

NUTTER, Commanding.

3.14 p. m. Battle Commander, Fort Strong.

Squadron reported beyond the graves off East Point probably to attack Bailey's Hill secondaries and Fort Heath. You will take this squadron and direct independent fire command of F's against the same.

Caution fire control to fire mortars first and hold fire of Winthrop 12 inch until bombardment of Heath is commenced.

NUTTER, Commanding.

3.20 p. m. Battle Commander, Fort Warren.

Direct fire commander, Fort Andrews, to fire mortars by pit salvos on leading ship coming in Broad Sound Channel when within range.

3.21 p. m. Southern battle commander reports "In Order." Range leading target in Broad Sound 11,900 yards.

3.25 p. m. Battle Commander, Fort Warren. Direct F. C.s to pick up leading battleships in Broad Sound and give range.

3.27 p. m. F. C.s reports range 11,350 yards.

Fort Strong reports first and second battle ships out of action, third crippled, and first cruiser out of action.

3.28 p. m. Battle Commander, Fort Warren. Direct fire commanders, Fort Revere, to fire Battery Ripley, on fourth ship at 10,000 yards, A. P. shell.

NUTTER, *Commanding*.

Battle Commander, Fort Warren. Direct fire.

Battery Stevenson, at 10,000 yards, A. P. shell, on leading ship.

Battery Bartlett, at 8,000 yds., on second ship.

NUTTER, *Commanding*.

Battle Commander, Fort Strong. Change target to fourth ship:

3.32 p. m. Fleet headed out.

3.33 p. m. Torpedo boat reported off Hull Beacon.

3.34 p. m. F. C.₅ reports torpedo boat off Hull Beacon not one of fleet.

3.38 p. m. F. C.₃ reports mortars firing on leading ship.

3.39 p. m. Battle Commander, Fort Warren. Direct fire Battery Stevenson, at 10,000 yards, A. P. shell, on rear ship in column, sailing southeast.

3.48 p. m. Northern Battle Commander, Fort Strong, reports cruisers in squadron 2125.

3.50 p. m. Both battle commands. Cease firing and rest.

Colonel Oaks dismiss infantry, but hold in readiness for further action.

3.51 p. m. Leading battle ships turning to come in.

3.52 p. m. F. C.₅ reports having fired 5 salvos on leading ship, 4 salvos on second leading ship, 3 salvos on third leading ship in column.

3.53 p. m. F. C.₅ reports torpedo boat coming through Hull Cut.

3.55 p. m. F. C.₅ reports range of leading battle ships 9,000 yards.

3.56 p. m. Battle Commander, Fort Strong. Independent action on cruisers in Broad Sound.

F. C.₂ reports range of leading battle ships 8,370 yards.

3.57 p. m. Battle Commander, Fort Warren. Direct fire, Battery Bartlett, at 8,000 yards, on third ship in column, sailing southeast.

NUTTER, *Commanding*.

3.58 p. m. Southern Battle Commander, Fort Warren. Direct F. C.₅ open fire on leading battle ship.

3.59 p. m. Battle Commander, Fort Warren. Independent battle action. Use Fort Andrews mortars at your discretion, covering squadron in either channel.

NUTTER, *Commanding*.

4.00 p. m. F. C.₂ reports leading battle ship heading in.

4.01 p. m. Strong firing.

Revere firing.

F. C.₃. Open fire with mortars on leading ship.

- 4.04 p. m. First battle ship firing on Revere.
- 4.08 p. m. F. C.₅. Open fire.
Both cruisers out of commission and battle ship crippled.
- 4.10 p. m. Stevenson out of order.
Put in order and report when so.
- 4.12 p. m. Northern Battle Commander, Fort Strong: Continue firing on cruisers coming in.
F. C.₅. Open fire with 6-inch guns.
- 4.14 p. m. F. C.₅ reports first and second battle ships out.
Change target to third battle ship. Identify No. 2.
Stevenson in order.
- 4.15 p. m. F. C.₃ reports no 6-inch ammunition. Cease firing with 6 inch.
- 4.16 p. m. F. C.₂ reports 3 shots fired from 12-inch. No. 2 gun out of order. Continue firing with No. 1, put other gun in order and report when so.
- 4.17 p. m. Salvo points in main ship channel asked for but not available at Fort Warren.
- 4.18 p. m. Bartlett reports third battle ship out.
Batteries Stevenson and Bartlett fire one more round.
- 4.20 p. m. Northern Battle Commander, Fort Strong. Change to battle ship in main channel.
- 4.21 p. m. Reports can't fire at battle ship without destroying searchlight.
Northern Battle Commander, Fort Strong. Change back to cruisers.
- 4.23 p. m. Battery Commanders, Southern Battle Commander. Independent fire action.
- 4.24 p. m. Northern Battle Commander, Fort Strong, reports inability to use big guns but can use mines. Use mines.
- 4.30 p. m. F. C.₅. Cease firing. Battle ships all passed Warren.
- 4.41 p. m. Phase ended.

FORT WARREN, August 2, 1907.

BATTLE COMMANDERS,

Fort Strong, Fort Warren:

The next phase period will commence at 8 p. m. Constant vigilance against attack will be exercised after that hour.

NUTTER, *Commanding.*

Shortly after the close of this phase I turned over the command to Lieutenant-Colonel Homer and returned to my station, Fort Heath.

I have no hesitation in saying that if the work performed by this corps has proven satisfactory to the United States authorities there will be no difficulty in supplying an artillery reserve in Massachusetts.

[Comments of district commander, Col. L. H. WALKER, on Colonel Nutter's report.]

The fact that different organizations had different blank forms, that "date of enrollment" for this tour of duty was mistaken for "date of enlistment" in the organization caused much confusion. The blanks bore no place for certificate of mustering officer; of course this could be written in, but a uniform blank corresponding with requirements of General Order 99, War Department, should be issued to organizations before leaving home stations.

The recommendation that the militia handle their own property up to the delivery of same to the artillery district quartermaster was made by this office when exercises were first ordered in March.

The tour of duty should be made at least ten days. Service target practice might be prescribed for some batteries, but if held by all companies within a week or ten days no other work could be attempted.

Attention is invited to the efforts to be made to introduce such State legislation as will give the Corps Coast Artillery, Massachusetts Volunteer Militia, 14 companies, including 2 torpedo companies, which at full war strength will be 1,308 men. The organization recommended resulted from consultation between Colonel Nutter and his adjutant with Captain Howell and Captain Todd, Coast Artillery Corps, with a view toward filling the needs of this artillery district. Attention is invited to that part of Colonel Nutter's report wherein he says "thus closing what I believe to be the best tour of duty this corps ever performed."

Orders were issued by Colonel Nutter, Corps Coast Artillery, to superpose paper on plotting boards and keep record of plotting during phase conducted by the militia.

But two of these track charts have been submitted, one from Fort Warren, First Company, Corps Coast Artillery, and one from Fort Heath, Eighth Company, Corps Coast Artillery; they were excellent.

[Col. WILLIAM H. OAKES, commanding Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

Headquarters and the First Battalion of the regiment were established at Fort Revere, at which post Maj. E. W. Hubbard was commander. The arrangements made by him for

the militia at that post were excellent and no labor or expense was spared to make everything satisfactory for officers and men.

On the different days during the week I visited the other posts in the district and inspected the camps of the different units of my regiment; found everything practically satisfactory and officers and men well pleased with the evident care and interest which had been taken by the officers of the Regular Army in their behalf.

The commissary-department matters were handled with promptness and dispatch.

Through the kindness and assistance of the officers of the Regular Army detailed with this regiment at the various posts a great deal of good instruction was received and it has been made evident to me that great benefit has been derived as the result of detailing of these officers. They were, without exception, very much interested in the work of the militia and took special pains to impart knowledge to the officers and men relative to reconnaissance, establishment of outposts, map reading, sketching, and field entrenchments. Practical work was done by officers and men along these lines.

I find on all sides, with but very few exceptions, a general appreciation of the fact that the tour of duty resulted in much good to the command. Officers and men were interested in the work; it was different from what they had ever undertaken before and no doubt under a more complete preparation would be thusly more interesting. I am of the opinion that if plans should be further developed which would enable us to understand exactly what the duty was to be and a longer time would be given a regiment in which to study up the work to be done that greater good would result. I should recommend in so far as possible that battalions be not broken into smaller detachments, but if this is necessary I believe it would be better if a battalion of three companies were organized, one to be commanded by the lieutenant-colonel and assigned to him as staff, in which case the regimental adjutant, quartermaster and commissary could be assigned to him as staff and have the working detail for the week, whereas in the tour of duty just ended headquarters had practically nothing to do after the arrival of the troops in camp, and

there were in certain cases conflicts of authority and a general misunderstanding as to what their position was and as to what duties were to be performed.

[Lieut.-Col. CHAS. B. WOODMAN, Corps Coast Artillery, Massachusetts Volunteer Militia, assistant battle commander, Fort Warren, Mass.]

Recommends that there be some means of communication between the forts and ships so that when a ship is put out of action it could be made to withdraw during that part of the phase and not go on firing indefinitely until they were tired.

[Lieut.-Col. MURRAY D. CLEMENT, Fifth Infantry, Massachusetts Volunteer Militia, Fort Andrews, Mass.]

The presence of officers from the Regular Army was most helpful and their kindly suggestions and criticisms were thoroughly appreciated by all.

I am heartily in favor of a continuance of the work initiated at this encampment.

[Maj. GEORGE F. QUINBY, Corps Coast Artillery, Massachusetts Volunteer Militia, relief fire commander, Fort Strong, Mass.]

Reports encampment running smoothly and careful inspection made on first day of exercise period.

I wish to say that in all my twenty-four years of service it was the most beneficial camp I have been through, and the instruction and attention of both officers and men of the Regular Army was far beyond what we have ever before received.

Recommends exercise period of ten days or two weeks and service practice.

[Maj. MORRIS O. DANFORTH, Corps Coast Artillery, Massachusetts Volunteer Militia, assistant fire commander, Fort Andrews, Mass.]

States that the duty performed by officers and men was of the highest order. Expresses thanks for courtesies extended.

[Maj. WALTER E. LOMBARD, Corps Coast Artillery, Massachusetts Volunteer Militia, assistant fire commander, Fort Revere, Mass.]

It is suggested that future exercises might be still more beneficial if the exercises were planned more thoroughly in detail at such a period prior to the tour of duty, that copies of the orders and details might be given to all officers con-

cerned, in order that they might suitably familiarize themselves with the special duties which they were expected to perform.

It is also suggested that in future joint army and militia exercises some provision should be made so that the personal baggage of both officers and men could be conveyed to the various fortifications with the troops themselves.

The arrangements for the various camps which were provided for by the post commander could not be improved upon. The latrines were in perfect condition throughout the entire week, the arrangements for providing a water supply were excellent, and the shower baths provided for both officers and men were all that could be asked for.

The army officers attached to the post were found to be thoroughly interested in the work and anxious and willing to render assistance to the officers of the Corps Coast Artillery at any and all times. All of these officers were found to be very capable men and thoroughly equipped to give the proper instruction that was necessary, the lectures given by each of them during the week being well delivered and very instructive.

If these joint army and militia exercises are to continue from year to year it is suggested that a more successful tour of duty may be performed by the Corps Coast Artillery, Massachusetts Volunteer Militia, if this organization is provided with proper books of instruction and position-finding instruments prior to the tour of duty so that they may become thoroughly instructed in their duties prior to the tour of duty. As it was this year, much valuable time was lost in studying and perfecting officers and men in the use of the instruments, which might as well have been done at the home station if proper equipment had been provided.

The Corps of Coast Artillery, Massachusetts Volunteer Militia, commenced to study heavy artillery in 1882 and for twenty-five years have been living in hopes that some of the promises of better equipment would at some future date be fulfilled. Owing to the nonfulfillment of these promises many proficient officers and men have become discouraged and left the service and at the present time a discouragement exists among the most enthusiastic of the Corps Coast Artil-

lery which will result in the loss of many more of our best officers and men unless something is immediately done to retain their interest. If the Corps of Coast Artillery is to be of any value as a reserve to the Coast Artillery Corps every opportunity should be given to them to improve their efficiency. They should be equipped with position-finding instruments and books of instruction should be immediately furnished them for use at home stations.

If the interest of the enlisted men is to be retained at future joint exercises no company should be assigned to guns unprovided with blank ammunition, subcaliber tubes, and position-finding instruments while other companies are provided with such material.

In future joint exercises, if such again occur, it is suggested that duties be provided for every officer and noncommissioned officer attached to headquarters, as men become discouraged by having no part in the work performed and simply be relegated as onlookers.

At future joint exercises it is suggested that no visitors be admitted to the fortifications, at least during the period of the maneuvers, as they seriously interfere with the work and prevent the members of the Corps Coast Artillery from attaining as much instruction as they otherwise would.

[Comments of district commander, Col. L. H. WALKER, on Major Lombard's report.]

The recommendation that books of instruction, position-finding equipment, etc., be furnished the Corps Coast Artillery at their armories is heartily concurred in, and has been often recommended in various reports, inspections, and through other sources.

[Maj. WILLARD C. BUTLER, Fifth Infantry, Massachusetts Volunteer Militia, Fort Banks, Mass.]

I have only the very highest praise for the enlisted men for the very soldierly way in which they performed these duties and for the most excellent discipline maintained throughout this tour of duty.

I wish to commend the officers for their earnest efforts in making this tour so successful and bringing so much credit to the State and to the regiment.

I would recommend that more infantry be stationed at Forts Bank and Heath, but hardly think this can be done, as one regiment is obliged to cover the whole district.

[Maj. FRANCIS MEREDITH, Jr., Fifth Infantry, Massachusetts Volunteer Militia, Fort Strong, Mass.]

This kind of duty (artillery support) is agreeable, but could be equally well performed at any infantry post.

[Maj. WILLIS W. STOVER, Fifth Infantry, Massachusetts Volunteer Militia, commanding First Battalion, Fort Revere, Mass.]

I wish to acknowledge the untiring efforts of the instructors assigned by the War Department to this battalion, Capt. Upton Birnie, Sixth U. S. Field Artillery, Lieut. M. E. Locke, First U. S. Field Artillery, and Lieut. Wallace McNamara, Twelfth U. S. Infantry. These gentlemen worked early and late from the beginning to the close of camp to give us every crumb of instruction which could be profitably imparted in the time allowed, and I can not express too strongly the vast benefit which has accrued to us as individuals, as well as a battalion, from the same. I strongly recommend that this be made a permanent policy of the War Department and that young, active, and ambitious officers of the Army, such as the gentlemen above named, be assigned to every militia camp in the United States.

The camp was delightfully located and was equipped with mess shelters, kitchens, shower baths, and latrines, under the supervision of Major Hubbard, the post commander. Little remained for the troops to do on arriving but to pitch their tents. The latrines deserve special mention, as ideal for all stations where sewer connections can be had and where a large number of men are to be accommodated. The whole invited neatness on the part of my men and the highest degree of care was exercised by them in keeping the seats and floors clean. I have often observed that dirty sinks lead to unsanitary practices and I can now add, from personal inspection, that a neat and comfortable latrine promotes sanitary practices on the part of the men who use them.

The health of the men was remarkable and the work of the surgeons was confined to trifling cases of minor surgery.

I would respectfully suggest that a higher measure of good would result from camps of this nature if plans for the same

should be formulated in the winter or early spring, instructors detailed, and the work laid out so that the officers of the militia might confine their studies to the scope of the programme adopted. A week is so short a space of time that it seems as though no moments should be spent in elementary instruction, and it is certain that if some idea should be communicated in advance of the kind of work to be taken up much would be accomplished at the armories in the way of preparation.

In closing, I wish to acknowledge the helpfulness and cordial support of Major Hubbard and his officers at Fort Revere, both in the preparation of the camp and in the carrying out of the week's work.

[Capt. E. DWIGHT FULLERTON, adjutant, Corps Coast Artillery, Massachusetts Volunteer Militia.]

I believe that this tour of duty has proved of more value to this corps, in certain ways, than any tour we have ever had. I believe the theory of assigning the corps to a district rather to a single post is most expedient. There is little question in my mind but that a two weeks tour would inure greatly to the benefit of the organization.

I have to add my thanks to those of every officer of the corps for the kindness shown us on every occasion by the officers of the Coast Artillery Corps and I am sure that whatever the corps was able to accomplish or whatever improvement it has made they will consider ample reward for their untiring efforts to give us the greatest amount of useful instruction in the short space of time we were together.

[Capt. FREDERICK SPENCELY, commissary, Corps Coast Artillery, Massachusetts Volunteer Militia, communication officer, Fort Heath, Mass.]

Too much can not be said regarding the kind and untiring efforts of the United States officers at the Fort Heath fire command to instruct those officers and men of the militia who were assigned to this station.

[Capt. H. H. HARTUNG, assistant surgeon, Corps Coast Artillery, Massachusetts Volunteer Militia, Fort Strong, Mass.]

Reports location of camp as ideal, food good, wholesome, and plenty of it; bread, however, coarse and dry.

Approved heartily use of McCall incinerators; this system the most practical and satisfactory method of disposing of urine and feces.

To me this tour of duty has been the most satisfactory and instructive that I have ever attended and personally I should like to see this continued in the future as I believed that being brought in contact with the Regular Army is of the greatest benefit to all concerned.

[Capt. GUY MURCHIE, corps quartermaster, Corps Coast Artillery, Massachusetts Volunteer Militia.]

(No report furnished War Department.)

[Comments of district commander, Col. H. WALKER, on Captain Murchie's report.]

There was no question in the minds of the regular artillery officers from the first that the property of the militia should remain in charge of the militia quartermaster until it reached the district, when the artillery district quartermaster would take the same in charge. The property is located in twenty or more different armories in as many towns throughout the State and in the State arsenal at Framingham.

In time of war I take it that individual companies would pack up and come to their proper station, the Government paying cost of transportation on certified vouchers of the militia quartermasters. This method should obtain during the exercises and was originally recommended by Colonel (now General) Davis, then artillery district commander.

[Capt. JAMES H. SMYTH, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Winthrop, Fort Heath, Mass.]

The tour as a whole was extremely profitable.

Prefers drill and target practice to "maneuver phases;" the latter regarded unfavorably.

Recommends that in future the whole period be devoted to coast artillery drill and target practice.

Recommends permanent assignments of companies to particular posts as reserves and that they be required to perform a certain amount of drill at these posts through the year.

[Capt. FREDERICK S. HOWES, Second Company, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Hitchcock, Fort Strong, Mass.]

Recommends that all the latest books, circulars, etc., pertaining to artillery service, in sufficient quantities, be furnished to each company as soon as published and adopted,

and that the strength of the companies be increased to at least 75 enlisted men.

[Capt. B. B. SHEDD, commanding Sixth Company, Corps Coast Artillery, Massachusetts Volunteer Militia, Fort Strong, Mass.]

This tour of duty was a success and proved very instructive to both officers and men.

I wish to express every appreciation of the uniform courtesy and endeavor all the regular officers and men showed in assisting us in our work.

Recommends that companies be furnished, as early as possible, drill regulations, range-finding outfit, etc., and says that if their artillery work has already proved of value to the regular service, with such an equipment as this their efficiency, he believes, would be more than doubled.

[Capt. W. RENFREW, Corps Coast Artillery, Massachusetts Volunteer Militia, Fort Strong, Mass.]

The opportunity for practical instruction on this tour of duty was excellent and similar opportunities will be advantageous.

Recommends that each armory be provided with plotting, range, and deflection boards and wind component indicator.

[Capt. J. H. FROTHINGHAM, Corps Coast Artillery, Massachusetts Volunteer Militia, relief fire commander, Fort Warren, Mass.]

States officers and men were interested in this tour of duty.

Recommends more drill books of instruction, etc., be issued to companies of the Corps Coast Artillery.

[Capt. F. M. WHITING, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Stevenson, Fort Warren, Mass.]

Reports the course of instruction at once comprehensive and interesting. The firing of blank cartridges a valuable experience.

Recommends service target practice at least at rapid-fire batteries.

States that with 13 previous tours of duty in artillery posts as a criterion to go by, this has been the most valuable experience that the Massachusetts coast artillery has ever had.

Acknowledges obligations to all regular officers for courtesy and kindness.

[Capt. PATRICK J. McNAMARA, quartermaster, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

Comments favorably on the site selected for headquarters of the First Battalion; also upon water supply, latrines, shower baths, kitchen, and mess shelters.

Thinks transportation could have been improved by using commercial line of steamships in the harbor leaving the regular quartermaster boats for the transportation of troops only.

Expresses appreciation for courtesies shown by the regular army officers.

[Capt. JOHN D. NICHOLS, commissary, Fifth Infantry, Massachusetts Volunteer Militia.]

The subsistence supplies were delivered promptly and in first-class condition; they were of good quality and gave universal satisfaction.

I made a tour of the other forts, visiting the battalion quartermaster and commissaries, and one and all expressed themselves with a great degree of satisfaction of the manner in which they were being treated.

I have nothing but the highest praise to give each and every officer who I came in contact with. The tour of duty was of great benefit to me and my department.

[Capt. CHAS. H. KEENE, assistant surgeon, Fifth Infantry, Massachusetts Volunteer Militia, Fort Warren, Mass.]

I would suggest that in future exercises the militia medical department and the militia line officers receive some instruction from regular army surgeons, the former on their work in general and the latter in military diets and camp sanitation.

[Capt. DAVID HANSEN, inspector of small arms, acting battalion adjutant, Fifth Infantry, Massachusetts Volunteer Militia, Fort Andrews, Mass.]

The tour of duty was beneficial to myself and I believe to all the officers and men participating, and would respectfully recommend that the system of instruction be continued in the future on the same lines.

[Capt. MARK E. SMITH, commanding Company A, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

As to the date selected for the maneuvers, I would suggest that as employers are much criticised for refusing to grant permission to their men to be absent from their employment to perform military duty the date of the annual camp duty should be fixed in the middle of a month, and should not, under any circumstances, include the first days of a month, as employers in the ordinary mercantile business or in banking institutions find it hardest to allow their employees to be absent on or about the first of a month. It was particularly hard on employers this year, as the week selected was called "Old Home Week" in Boston, and owing to the fact that retail merchants expected a large trade from the visitors to the city, such merchants offered considerable objections to their employees being absent from business.

As to the maneuvers, I would suggest that if it is planned to have permanent infantry supports from the militia that the officers of the organizations selected as such infantry supports should become thoroughly familiar with the ground and its tactical advantages and that during the winter months schools for officers and perhaps noncommissioned officers should be held, at which lectures should be given by regular officers detailed for the purpose and various problems, based on the conditions at the various posts, should be worked out.

[Capt. GEORGE T. JONES, commanding Company B Fifth Infantry, Massachusetts Volunteer Militia, Fort Strong, Mass.]

Reports favorably upon the duties assigned to the infantry supports, upon the schools of instruction established, and upon certain phases participated in by his company. His only criticism pertains to the quartermaster's department in delaying the return of the company property to the home station.

[Capt. CHARLES H. ROBBINS, commanding Company D, Fifth Infantry, Massachusetts Volunteer Militia, Fort Heath, Mass.]

The work which appealed to me as the most instructive at this tour of duty was the erection of hasty intrenchments, patrol work, and the observing of natural defensive positions

to be taken up in event of an attack. Especial interest being taken in intrenchments.

I wish to remark on the courtesy, advice, and enthusiasm of all of the officers of the Regular Establishment with whom I came in contact, their assistance doing much to make this tour of duty the most instructive of any I ever attended.

[Capt. CLIFFORD E. HAMILTON, commanding Company F, Fifth Infantry, Massachusetts Volunteer Militia, Fort Warren, Mass.]

The tour of duty was very instructive and valuable to officers and enlisted men of the company and much was learned in the line of taking up positions, intrenching, and of both attack and defense by landing parties, as well as a very profitable week in the instruction and performance of guard duty.

Every courtesy and assistance was tendered by the commander and officers of the Coast Artillery Corps stationed here and especially by Captain Smith, to whom the officers and men of the command are indebted for his painstaking efforts to make the tour instructive and of value in all lines of practical work.

I would recommend that one regiment of militia be designated as "artillery supports," to be more fully instructed in the duties pertaining to such work, and to be ready at any time to proceed to their stations knowing in advance the duties to be performed.

It would need at Fort Warren a much larger force than one company to properly perform said duties.

[Capt. GEORGE P. LATIMER, commanding Company H, Fifth Infantry, Massachusetts Volunteer Militia.]

I believe that the instruction received at this camp was entirely beneficial to my command and I feel indebted to the infantry officers detailed at this post for the instruction received. I desire at this time to express my appreciation of the extreme courtesy and willingness shown by all officers of the regular service to impart any information desired.

[Capt. LAWRENCE W. COOK, commanding Company I, Fifth Infantry, Massachusetts Volunteer Militia, Fort Andrews, Mass.]

The camp site is, in my opinion, well chosen, being on sandy soil that would quickly absorb moisture. The maneuvers as carried out were very instructive and in my opinion

could be repeated with a great deal of benefit to both officers and men, the officers of the Regular Establishment giving lectures and also being at all times willing to offer advice and suggestions. A different problem of attack and defense was worked out each day, particular attention being paid to use of cover; while the formation of this island renders use of effective cover very difficult a decided improvement was shown from day to day.

The schedule of drills carried out by the provisional battalion called for close-order drill first period in morning and practical and theoretical drill second period, extended-order drill being taken up in afternoon; attendance at all drills was excellent.

Latrine seats were built too high for men of ordinary height and in my opinion dirt vaults would have been better as in wet latrines, if a good deal of care is not exercised, men using them are liable to become soiled, thus offsetting their otherwise good points.

[Comments of the district commander, Colonel WALKER, on Captain Cook's report.]

The latrine complained of was the Reed latrine trough. Several methods of disposal of urine and faeces were tried throughout the district; the troughs at Revere flushing into a sewer were perfect from a sanitary point of view, so was also the McCall incinerator system. Would recommend the latter at posts where direct sewer connections can not be made.

[Capt. FRANK E. CUTTING, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

Location and arrangement of camp excellent; bathing facilities excellent; disposal of garbage excellent; health of men during encampment of the best.

Twenty-five men and 3 officers volunteered for a night attack upon Peddock's Island. This movement was made by boats and was not only very instructive, but the movement was made in good order.

It is recommended that dates for holding encampment and maneuvers embrace dates between 10th and 25th of month.

Business houses object to their men being away the first and last few days of the month.

Payment of militia troops should be made direct to company treasurer on assignment rolls. This is the only means the company commander, who is responsible to the State for arms and equipment, has of making good any losses on the part of the men of his command.

MOVEMENT OF TROOPS AND EQUIPAGE.

It would be preferable to receive a money allowance at the hand of the Government and individual contracts made. Camp equipage would not have to leave the home station days in advance and be delayed in its return, as was the case during the encampment just closed.

[First Lieut. ALBERT A. GLEASON, Second Company, Corps Coast Artillery, Massachusetts Volunteer Militia, Fort Strong, Mass.]

Recommends:

1. That during the season of indoor work regular officers of the Coast Artillery Corps be assigned to give both theoretical and practical instructions on coast artillery work to the various companies composing the Massachusetts Corps of Coast Artillery.

2. That arrangements be made so that during the fall and spring months gun detachments may go to the various posts in the harbor on Saturday afternoons and receive instruction in the service of the guns.

3. That each officer and noncommissioned officer be furnished with the latest drill regulations for coast artillery.

4. That all of the members of each company be furnished with such pamphlets on coast artillery work or extracts from drill regulations as will enable them to study the theoretical side of coast artillery drill.

[First Lieut. J. E. BREWER, Fifth Company, Corps Coast Artillery, Massachusetts Volunteer Militia, range officer, Battery Hitchcock, Fort Strong, Mass.]

Recommends Corps Coast Artillery be furnished plotting boards, books of instruction, etc.

Extends thanks for valuable assistance rendered by officers and men of the Regular Army.

[First Lieut. DAVID H. FOGG, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Bartlett, Fort Warren, Mass.]

The tour of duty was one of the most instructive and interesting that this command ever participated in and its success was due largely to the untiring and devoted zeal of the regular army officers stationed in Boston Harbor.

[First Lieut. GEORGE M. KING, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Sanders, Fort Revere, Mass.]

Reports successful subcaliber practice at range of 2,260 yards, making 13 hits out of 20 shots. Comments on the good work of the men assigned to Battery Sanders and the careful and intelligent instruction given by the range detail of the Eighty-third Company, Coast Artillery Corps.

Recommends that his company be permitted to visit harbor posts for purpose of study and drill each month during the year; also that there be installed in South Armory, Boston, a complete range station.

In closing, desires to say that the encampment just ended has not only been the most enjoyable but the most practical and the most instructive that we have experienced, and it is to the officers and men of the Regular Army with whom we have served that we are most deeply indebted for its success. Their efforts to make it so were constant and untiring. We have started on the right course to become an efficient artillery reserve.

[First Lieut. HENRY D. CORNERAIS, battalion adjutant, Fifth Infantry, Massachusetts Volunteer Militia.]

The tour was very instructive, orders and work well carried out, improvements being made all along the line as time went on. I think it would be better, however, not to split up a battalion, as all 4 companies under the major are held in better control and it gives more material to work with.

[First Lieut. WILLIAM H. WILSON, Company A, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

I was very well satisfied with this tour of duty, but would not like to be permanently assigned to this work.

[First Lieut. GEORGE H. DANIELS, Company C, Fifth Infantry, Massachusetts Volunteer Militia, Fort Andrews, Mass.]

The instruction given has been greatly to my benefit. A rapid improvement in the part taken by the enlisted men as the week advanced has been noticed. It would seem that the practical problems taken up under the supervision of the Regular Army officers are much preferable to the usual routine close order drills of the ordinary State camps.

[First Lieut. E. H. DORR, Company D, Fifth Infantry, Massachusetts Volunteer Militia, Fort Heath, Mass.]

We were invariably treated with courtesy and consideration by all the regular officers who were detailed to coach us. A continuation of the same or similar maneuvers next year could not fail to be of even more benefit to our militia.

[First Lieut. JOHN F. WILLIAMS, Company F, Fifth Infantry, Massachusetts Volunteer Militia, Fort Warren, Mass.]

As supports to heavy artillery, infantry should have a knowledge of machine guns.

This knowledge, in my opinion, can be best imparted by having more such guns stationed with each regiment and the officers and noncommissioned officers drilled in the use of same at least once a month.

As militia organizations, especially infantry, have but six days each year to drill in the field it is, in my opinion, advisable that the regiments should perform this duty as a unit and should not be divided into small posts.

As infantry, nothing can be learned at these posts that can not be taught at their home stations in armories.

Time should be devoted to exemplification of our post extended order and attack.

Under the direction of such regular officers as have been detailed the past few years the militia should become very efficient.

[Comments of district commander, Colonel WALKER, on Lieutenant Williams' report.]

This officer loses sight of the fact that artillery supports (infantry) are necessary as a part of the plan of defense. Personally he may not care for this duty and it is perfectly proper for him to so state, but the duties of artillery supports can not be taught in an armory at home stations.

[First Lieut. PHILIP B. BRUCE, Company H, Fifth Infantry, Massachusetts Volunteer Militia, Fort Strong, Mass.]

Reports on beneficial and interesting work, both practical and theoretical, accomplished during the exercises.

[First Lieut. THOMAS F. WILLIAMS, Company I, Fifth Infantry, Massachusetts Volunteer Militia, Fort Andrews, Mass.]

I suggest that the same (exercises) should be repeated by the same provisional battalion with one additional company in order that the island could be garrisoned in time of war by troops that would be thoroughly acquainted with the island, also suggest that each company commander should be supplied with a map of the same (Peddock Island) before such maneuvers in order to make a study of the same.

[First Lieut. JAMES H. MANN, Company L, Fifth Infantry, Massachusetts Volunteer Militia.]

All drills were well attended and under the supervision of the regular officers.

Many valuable suggestions were advanced.

It was the best camp I ever attended and we have learned more in this tour of duty than in all the tours of previous years combined.

[First Lieut. GEORGE A. WARDWELL, battalion adjutant, First Battalion, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

States that he is in favor of having regular army officers detailed with the militia and believes it is the only way to keep in touch with the science of war. Comments favorably upon the practical and common-sense instruction given by the officers detailed from the regular establishment.

[First Lieut. ALBERT C. GRAY, Fifth Infantry, Massachusetts Volunteer Militia.]

Comments favorably on instructions in making field sketching and road map.

States he believes that small camps of instruction are preferable to large ones, as the officers and men of the State troops come in closer touch with the instructors and thus learn more than would be the case where a very great number of troops were encamped.

[First Lieut. ALEX. T. TORNROSE, Fifth Infantry, Massachusetts Volunteer Militia, Fort Andrews, Mass.]

I recommend that certain portion of infantry of the seaboard States be assigned as supports in coast defense so that they may become familiar with methods of attack and defense in seacoast fighting and looking to the fulfillment of this branch as an artillery support; if necessary, they might be called coast infantry.

I further recommend that a book of instructions in machine-gun drill be issued to each company of infantry.

As to the step taken in the development of the problems involved in the defense of our seacoast the work has been more instructive than anything we have ever had. From my observation I am able to say that the defenses of Boston elicited surprise from many officers of the infantry arm, they being unfamiliar as to the amount of material installed at the coast forts and to what their duties might be as supports in coast defense.

[Second Lieut. B. E. GRANT, Fifth Company, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Hitchcock, Fort Strong, Mass.]

Recommends:

1. That the gun detachment be quartered nearer the guns, as in case of the "alarm call" the details have to go a long distance and the men get exhausted before manning the guns.

2. That more time be given for the instruction of the several details as we get most of our instruction from blueprints and books, and I think that a little more of practical instruction would be a great benefit before starting on the phases.

3. That more men be attached to the gun detail, as men get injured and we have no reserve to draw from. Extra men are needed, especially on the traversing detail.

I also wish to thank the officers of the Coast Artillery Corps at Fort Strong for the courtesy and willingness shown by them to give instructions and aid in every possible way.

[Second Lieut. A. F. WOODSIDE, Sixth Company, Corps Coast Artillery, Massachusetts Volunteer Militia, Fort Strong, Mass.]

Expresses appreciation of interest shown and care taken by officers and men of Regular Army at Fort Strong in giving instruction.

[Second Lieut. C. WARREN LEACH, Corps Coast Artillery, Massachusetts Volunteer Militia, Battery Sanders, Fort Revere, Mass.]

I do not think that our company was ever quartered in a more healthy or beautiful spot; the scenery and the surrounding island and harbor were very picturesque, and the convenience of having the camp and the men so close to the guns we had to drill on made the week's tour a very pleasant one.

Comments most favorably on sanitary conditions, shower baths, mess halls, kitchens, electric lighting, and all camp arrangements.

I do not think that a finer battery of guns is in position in the United States than the * * * battery at Fort Revere, and it is a pleasure to drill and work about it.

Subcaliber practice very successful at stationary target 2,400 yards; 25 rounds were fired and 13 or 14 hits recorded. Comments favorably on lectures given by regular post officers and expresses appreciation and praise for courteous treatment and instruction given, and states that the eight days' tour at Fort Revere was thoroughly enjoyed by all.

[Second Lieut. SIDNEY E. BROWN, Company F, Fifth Infantry, Massachusetts Volunteer Militia, Fort Warren, Mass.]

We were fortunate in having an able officer assigned to our command as instructor and received very valuable instruction.

I would recommend that one or more regiments of the Massachusetts Volunteer Militia be designated as seacoast artillery supports.

[Comments of the district commander, Colonel WALKER, on Lieutenant Brown's report.]

It will be noted that the captain and second lieutenant of this company (Company F, Fifth Infantry) are very favorable to this duty, while the first lieutenant of the same company, and under the same conditions, prefers duty in larger camps.

[Second Lieut. FRED L. WHITING, Company H, Fifth Infantry, Massachusetts Volunteer Militia, Fort Strong, Mass.]

For practical instructions and general benefit for infantry I do not believe they derive a great amount of knowledge from fort assignments.

When acting in conjunction with other regiments of infantry, field artillery, and cavalry under field service the scope of knowledge is far greater.

[Second Lieut. HENRY C. BACON, Company L, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

Comments favorably on instructions received from officers detailed from the Regular Army and upon the practical instruction of hasty intrenchments, and the work of outpost duties, advance and rear guard, practice marches in heavy marching order, attack and defense of intrenched positions, boat drills, embarking and disembarking, Gatling gun drill, infantry in support of artillery, and road and field sketching.

States he considers this tour the most instructive of any in which he has participated.

[Second Lieut. THOMAS F. BROWN, Fifth Infantry, Massachusetts Volunteer Militia, Fort Strong, Mass.]

Before and after drill period the instructors were on hand to give such information as was desired by officers and men. From the good results shown by the command it was in every sense a very profitable tour and such work should be given the militia in future encampment.

[Second Lieut. ROBERT M. MAGEE, Fifth Infantry, Massachusetts Volunteer Militia, Fort Revere, Mass.]

I think the camp was the best the regiment ever performed, the officers and enlisted men received a great many valuable instructions, and I think it a great benefit for the militia to have the maneuver with the regular troops.

The sanitary conditions were of the best at this camp, the shower baths and flush sinks were a great improvement over other camps that we have been to and were always in the finest condition.

[Comments of the district commander, Colonel WALKER, on reports submitted by militia officers.]

The reports of all officers of the Artillery Reserves and the Artillery Supports, almost without exception, are earnestly commendatory of the work prescribed, appreciative of the instruction received and recommend a continuance of the scheme outlined in Circular 17, W. D., 1907.

Practically the only unfavorable comment made was in regard to delay of the return of a part of the baggage from Fort Revere to the home stations.

In this connection it might be said that the Depot Quartermaster might have hired additional transportation, but on the other hand the organizations should have left a detail in charge of their baggage to guard the same, protect it from rain and assist in loading.

The entire militia force, 24 companies, headquarters, staff, and bands, left the District between 7 and 9 A. M. to participate in a parade in Boston by orders of the Governor, leaving all their baggage and camp equipage to be cared for by the regular troops.

No complaints were made by the regimental or corps quartermasters.

In order to get the troops to Boston in time for the parade the torpedo planters' and quartermaster steamers were utilized. The steamer *General Jesup* and a steam lighter hired by the Depot Quartermaster followed to take the baggage and camp equipage. It appears that some of the baggage was not gathered up the same day the troops left. In any event no blame attaches to the regular artillery troops in the matter, but rather praise for the cheerful manner in which the large amount of additional work in connection with this encampment was performed.

STATE OF RHODE ISLAND.

Artillery District of Narragansett.

[Date of exercises: July 7 to 15.]

COMMENTS OF REGULAR OFFICERS.

[Col. WALTER HOWE, Coast Artillery Corps, commanding artillery district of Narragansett, Fort Adams, Rhode Island.]

The instruction at the batteries was careful and as thorough as possible considering the short period of time in which it had to be given. The enlisted men of the militia took hold of this part of the work with interest and perseverance.

They were thoroughly instructed in all duties at the piece and especially in regard to the precautions necessary to safety. The militia officers also were present at this instruction and were also taken to the range tower and instructed in the use of the instruments, plotting boards, etc.

Recitations for noncommissioned officers of the militia were held daily and added greatly to the thoroughness of the instruction.

The only officer who seemed to thoroughly understand the theory of the fire-control system was Captain Green, Second Regiment Rhode Island National Guards, chief engineer officer on the brigade staff. He is a civil engineer and announced his intention of qualifying for a position of this kind should the Government establish a qualification and examination.

Subcaliber practice was conducted by the militia with their own officers and men in plotting room and at the guns, suitable officers and men being detailed to see that no accidents occurred. Two regulars were detailed at the telephones to avoid accidents in transmission of data. Their practice was creditable.

The feeling of the militia that the regular troops regarded them as "tin soldiers" and were disposed to look down upon them with contempt was entirely dispelled during the encampment, both at Forts Adams and Greble. At both places the most cordial relations existed. In no case did I hear of any attempt at imposition of any kind and all members of the militia who spoke to me on the subject expressed the highest appreciation of the courtesy shown them and hoped they would come back next year.

The discipline was most excellent. Orders were never disputed, and except in regard to the reports required of each officer in regard to the encampment, were promptly obeyed. At Fort Adams 23 reports were submitted by militia officers before leaving out of 37 that should have been received.

At Fort Greble none were submitted by militia officers before leaving. There were 35 militia officers at that post. The commanding officer of Fort Greble was furnished with a copy of the same instructions furnished the district commander in regard to this matter but no reports were received.

Since writing this report, and following a letter I wrote to the adjutant-general Rhode Island National Guard, on the subject, reports have been coming from the First Regiment at various times.

OFFICERS' LYCEUM.

The lyceum was held every night during the period from July 8 to 13 that was possible. July 12 and 13, owing to attacks from Fort Greble, the lyceum had to be omitted.

The officers paid strict attention and expressed themselves pleased with the lectures, but in the main they seemed to lack the preparation necessary for a full understanding of the subjects.

[Maj. JOHN C. W. BROOKS, Coast Artillery Corps, commanding Fort Greble, R. I.]

From start to finish all displayed great interest in the work and also great aptitude. In the afternoon and at night an occasional "call to arms" was sounded. I found that nearly all preferred to work in the stations and at the guns rather than rest or amuse themselves in any other way.

Passes were authorized from 12 noon to 6 p. m., but during the whole week there were only eight applications and I believe all of these were to attend to some official duty and were not for pleasure.

The lectures or lyceums were marked successes and aroused much interest.

Quarterly firing took place on July 10 and was greatly appreciated by the militia. I do not think that the records are as good as they would have been if fired as usual, but the result warrants the loss in efficiency and I think that the training to fire under the changed conditions is beneficial.

From the conclusion of the firing until the end of the week the militia filled all positions and did all the work, with the regulars as instructors. The subcaliber firing of the militia was unusually good. The amounts allowed were abundant. The blank charges allowed were way in excess of what was needed.

Wednesday and Thursday Fort Adams attacked Fort Greble and Friday and Saturday Fort Greble attacked Fort Adams. These events were spectacular, but I believe so far as instruction goes it was time lost.

I believe it would have been better to have employed the various boats at any and all times of day and night to run by all the forts and exercise the garrisons in "call to arms" and searchlight drill rather than to attempt landing parties. Neither fort had supports enough to defend the post from a strong landing party, and in each case the general question was "who won"?

Without umpires to rule out parties when disabled I believe it would be wise to omit this part of the programme and certainly to limit the attack to one day to each post.

The sending of additional regular officers to the post was of great assistance and more officers could have been easily made use of.

On the whole I found that this regiment (First Regiment Rhode Island National Guard) appeared to take great interest in the work and showed an aptitude far beyond what I expected.

A most friendly feeling has developed between the visiting and permanent companies which should work to the interest of the service.

[Maj. A. M. HUNTER, Coast Artillery Corps, fire commander, Fort Adams, R. I.]

The enlisted men of the Rhode Island militia who came under my close observation as members of the fire commander's station detail were men above average intelligence and acquired a fair knowledge of the use of the instruments in the station in a very short time. In my opinion they would be of value for such work in time of emergency and with a little more time would form a very efficient detail.

It is a fact which it seems proper to note that while there is on the shores of Narragansett Bay a population of approximately 500,000, including the cities of Providence, Fall River, and Newport and including also within the field of fire of a hostile fleet many million dollars worth of property, the State of Rhode Island has among its organized militia no coast-artillery troops; it would also seem that there is no section of the country where there should be more.

I am also credibly informed that many of the largest manufacturers of Providence discourage the men in their employ from belonging to the militia, while some few encourage them to do so; of two companies of national reputation I am informed that the Brown & Sharp Manufacturing Company is an example of the first class and the Gorham Company of the second. I am further informed that if all the large employers of labor adopted the policy of the last-mentioned concern in regard to the militia that the militia of the State of Rhode Island would be much improved in personnel.

In my opinion, the militia in camp at Fort Adams derived much benefit from the week spent here and the United States received a fair return for the cost of having them here.

[Maj. EUGENE T. WILSON, Coast Artillery Corps (Observer).]

It strikes me, from my observation and experience at three maneuvers, that it would be economy if a standard water-closet with urinal and a standard bathroom and lavatory were adopted, also a standard building to put them in, with a bill of lumber made out for the building. The whole thing should be printed and distributed. Three plans should be drawn separately, one for the building used for water-closets, one for the lavatories and bathrooms, and also a plan for a building containing all these features, for there are many camp sites where the location may be such that they can all be in one building. Where separate installations are made two companies can be accommodated under one roof, but to insure proper responsibility for police and sanitation they should be without direct communication from one to the other.

The sanitation was excellent. The post surgeon carefully inspected the camps twice a day. They were uniformly clean, tents well drained, and bedding aired. The weather at all times was delightfully cool and there was practically no sickness.

PERSONNEL.

The physical appearance, good healthy look, and the characteristic self-reliant, although respectable, bearing of the regular garrisons at both Fort Adams and Fort Greble was splendid.

In comparison the physical standard for admission to both national guard regiments seemed very low. In the Second Regiment, at Fort Adams, it was exceptionally so. A very large per cent of the men were undersized boys. In view of the fact that only thirteen per cent of the First Regiment and $9\frac{1}{2}$ per cent of the Second Regiment had enlisted since June 1st it would seem that the men present fairly represent the average condition of the companies as to physique during the year. Whether this condition as to physique can be remedied here and elsewhere I am unable to say. Based upon our experience in the Civil War we can expect nothing different. The report of the actuary of the sanitary commission for 1862 shows that out of the first million volunteers fourteen per cent were 18 years old and younger and 40 per cent were 21 years old and younger, and it also shows that out of about 220,000 youths 18 years old in the northern states by the census of 1860, 120,000 of these were in the Union Army in 1861. Apparently these national guard regiments were in about the same relative position as to age and physique.

As far as could be observed there was not much difference in the enlisted personnel of the two regiments, except as to physique. It was noticed that the efficiency of the organizations depended largely upon the character of their leaders. When the regimental and company officers were men of ability and enthusiasm the exercises went off very much smoother and the men learned a good deal more. A national guard company is just like every other company—just what the officers make it.

Discipline, as far as violation of regulations was concerned, was excellent. Camps were quiet and orderly at all times, day and night. I did not see a drunken man during the exercises. If we mean by discipline something higher than mere obedience to post orders and regulations—if we include in it the proper formation of the habit of command on the part of the officers and the proper acquirement of the habit of allowing himself to be commanded on the part of the enlisted man—it was evident that both regiments knew no more than could be expected of organizations of their character. The formation of habits, good or bad, requires time, and

the national guardsman has no time for this development of his inherent good qualities. It is this higher form of discipline that officers and soldiers must take to the battlefield and it is because untrained organizations have not possessed it that has caused them at times to be, offensively, but broken reeds. Enthusiasms will not produce it.

I saw parades of the national guard at Fort Adams only. They were very fair.

In the instruction as coast artillery reserves good progress was made. The men took to it kindly and the regular garrison was patient in giving instruction and kindly in feeling. The national guard turned out promptly at all calls to arms and manned the guns quickly. In the subcaliber practice their elevations and erections were checked by regular soldiers. Fair progress was made at both garrisons in plotting-room details. It could not be expected that in a week men could make any more than fair progress or that at the end of the week an efficient range section could be produced. The progress the men made at the guns depended a good deal upon the knowledge and enthusiasm of the company officers. It was much better at Fort Greble, the officers there being very much more enthusiastic, and consequently the men were. They learned faster and did better work. With enthusiastic officers of some mechanical bent of mind I see no reason whatever why very satisfactory results should not be obtained as coast artillery reserves. Wherever the officers possessed these qualities they certainly attained good results. Where the officers were indifferent or ignorant and the men were not well disciplined they did not. I should say that the results obtained at Fort Greble of the coast artillery reserves were quite satisfactory and at Fort Adams fairly so.

One battalion of national guard at both Fort Adams and Fort Greble were assigned to duty as coast artillery supports. Since this work was essentially infantry work the guardsmen had some foundation in its elements in their armories. Under the instruction of the regular officers assigned to duty with them they made most excellent progress. They were practiced in such exercises as "normal attack," minor problems in defense of particular parts of the terrain, etc. At Fort Adams some little practice was had in con-

structing entrenchments. I believe the instruction given by these very capable young officers was of the highest value and I noticed very marked improvement.

As a rule the military horizon of the average national guardsman has been limited by a drill book and guard manual furnished him by the National Government. That there was anything necessary for a soldier to know which was not contained in these two books has never before entered the heads of thousands of them. In the practical instruction at the large brigade maneuvers we have had in the past units sometimes as small as a battalion, but generally as large as a regiment, which have temporarily formed parts of larger commands. They have carried on what has been to them complicated maneuvers on the regimental or brigade scale. Consequently the average guardsman, both officer and man, did not appreciate that there was much for a company or battalion commander to learn outside of parade drill. The drill book and the guard manuel have been, therefore, his alpha and omega. Many of them have committed both these books almost verbatim from cover to cover. Having no broader guide they have no broader conceptions.

The instruction of these small units by a large number of bright, snappy officers from the service schools tremendously widens their military horizon. The stimulating enthusiasm and kindly criticisms of these officers have produced most beneficial results. All the guardsmen questioned informed me that they have derived the greatest benefit from this instruction. Under it things whose existence even were absolutely undreamed of now appear of the greatest importance.

It was very conclusively demonstrated that in very thick weather searchlights and all other lights on shore should be put out, as they afford more aid to navigation than information of the advance.

It was also demonstrated that during thick weather a chain of sentinels must be thrown out along the water line in order to furnish early information of attempts to land.

It is believed that work by spies is not within the purview of these exercises.

I take it that the object of these exercises is—

1. To stimulate the interest of the national guard of the coast States in that part of coast defense which pertains to

the coast artillery with a view to the ultimate formation of coast artillery reserve organizations in these States and to develop the best means of exciting and keeping up such interest.

2. To instruct part of the organizations taking part in artillery proper as artillery reserves and part of them in the duties of artillery supports, and to develop the best methods of imparting such instruction.

3. Incidentally, and incidentally only, to develop the weaknesses of our forts and defense system and the necessary remedies for their correction.

The first question and the most important one is, then, have these maneuvers been successful in stimulating an interest on the part of the Rhode Island National Guard.

I think they have been unquestionably successful. I conversed with a good many national guard officers on the work of the men. I found that when the proposition was first submitted to them last spring there had been a good deal of opposition to the scheme; that the officers and men appreciating that they knew nothing of coast artillery were fearful that they might suffer in comparison with regular troops; that they were afraid that there would be an ironclad discipline which would take away all the pleasure from this, the one vacation that most of the men can afford. There was some fear that the amour propre might be wounded by regular officers and soldiers making fun of their ignorance. In addition to the foregoing the troops had an infantry brigade organization working which must be completely broken up for all purposes and the regimental and battalion organizations must also be broken up when troops were assigned as artillery reserves. It was, therefore, with a good many misgivings that most of the officers came to this camp. Happily, they found nothing in the conduct of the regular troops, officers or men, to which a just man could take exception. The regular garrison appreciated that the visiting troops had had no opportunity to learn and their attitude was universally kind and helpful. The district commander, Colonel Howe, was tactful and considerate. The exercises planned by him were not at first either elaborate or fatiguing and by the time the men were ready to take up more arduous work they had, so to speak, got their bearings. Their rela-

tions with everybody were cordial; their fear had vanished; their pride was not wounded, and consequently their enthusiasm greatly increased. I think the progress they made depended solely upon their ability to grasp the opportunities afforded. I found, in fact, that some of the officers who had been most energetic in their opposition before arrival were the most enthusiastic and did some of the best work. So far as I was able to judge the attitude of the brigade commander was cordial and helpful. He certainly was not in opposition during the exercises. The commanding officer of the First Regiment at Fort Greble told me that the maneuvers were, in his opinion, a success from a guardsman's standpoint.

It is suggested that the course at the artillery school should include a very limited amount of instruction in those branches of military art applicable to land defense of fortifications.

These maneuvers were felicitous and successful. They required hard work and it was done cheerfully; they required severe sacrifice on the part of the Rhode Island officers and men, and they made them during the exercises ungrudgingly. The general spirit of everybody was a desire to achieve beneficial results for the common good of both services. The deficiencies reported are deficiencies in small things only. They have not obscured in my own mind the unquestionable success of these exercises as a whole, but merely point out the way for wider scope and influence and to closer relations.

[Capt. C. B. SMITH, Coast Artillery Corps, commanding Battery Edgerton,

Fort Adams, R. I.]

The men of Companies A and B, Second Regiment, were undersized and too small to efficiently handle 12-inch mortars.

They took interest in the work, and in view of the difficulties under which they were working did very well indeed.

[Capt. F. E. HOPKINS, Field Artillery, commanding One hundred and ninth Company, Coast Artillery Corps and Battery Sedgwick, Fort Greble, R. I.]

The zeal displayed and the interest taken in the work was very commendable.

The week's work was in my opinion most beneficial to all concerned.

I would recommend that the number of days allotted to attack and defense be cut down or cut out altogether in future exercises.

[Comments of the district commander, Colonel Howe, on Captain Hopkins's report.]

In regard to the recommendation that the night attacks should be reduced to two or cut out altogether, I would say that the personal experience of officers in regard to searchlights both on the boats and on shore was very valuable; but attacks by landing parties can only be of use when there are a sufficient number of officers to have an umpire with each command, with authority to stop any portion when defeated and to stop any portion before the troops can come into actual contact. In our attacks we had not sufficient officers, hence, in the attack on Fort Adams, troops that had been under the fire of a Gatling gun and four companies of militia with a searchlight turned on them promptly joined in the attack. As considerable jealousy already existed between the First and Second regiments some one would have undoubtedly been injured had I not had the recall sounded by all the buglers I could raise. They were determined to actually take our power house. This they could not have possibly done, as it was protected by a greater number of troops than they had equally determined to defend it, hence nothing but injury to participants could have resulted from permitting them to continue the attack.

[Capt. RICHARD T. ELLIS, Coast Artillery Corps, commanding One hundred and tenth Company, Coast Artillery Corps, Fort Adams, R. I.]

Both the regulars and the national guard enjoyed the encampment very much and at the same time exhibited much more interest than I really expected, the regulars in giving instruction and the national guard in receiving it.

The discipline and conduct of both regulars and militia-men was excellent, there being at no time the slightest friction, disagreement, or unkindly feeling, each apparently vying with the other in their efforts to do their best.

I consider the encampment of regulars and volunteers as contemplated by the Chief of Artillery and carried out by them as far as possible an excellent thing.

If possible, I think much time could be gained if the national guard could receive some instructions a short time previous to their encampment by competent noncommissioned officers detailed from the batteries to which they will be assigned.

[Capt. F. K. FERGUSSON, Coast Artillery Corps, commanding U. S. Army torpedo planter *Colonel George Armistead*, Fort Adams, R. I.]

I. In my belief, more systematized instruction could have been given the national guard assigned as infantry supports, as well as the portion assigned to the guns, had they remained ashore during the entire exercises. If not needed during any phase to man the guns or as supports, they should be detailed to observe the work of others, but always ashore. Their detail on landing party or detail afloat seriously breaks into the work they were supposed to be learning ashore. I am opposed to the idea of forming landing parties out of companies of guardsmen. It is not contemplated that any instruction in this line of work be given (this feature being naval, not artillery, work), and besides such enterprises, with men who do not thoroughly understand shore duty, much less duty afloat, are very dangerous. I therefore recommend that in future exercises the national-guard troops perform only shore duty. If landing parties are necessary I suggest they be composed of picked regular troops who are accustomed to and familiar with handling small boats.

II. Some confusion afloat arose from an insufficiency of orders. In my opinion the following procedure would secure the best results on the part of the forces afloat:

The artillery district commander, several days before the beginning of hostilities, to indicate to the senior officer afloat his wishes regarding naval attack—when he wishes the phase to begin, etc., whether a distant bombardment, a run past, or landing parties are desired, in fact the general scheme of attack—then let the latter officer work out the details, times of departure for the different vessels, their itinerary, etc., and then submit these in writing to the district commander. If he approves, the adjutant to issue them as confidential orders and they are to go only to officers interested. I can not too much emphasize the importance of clearly written orders covering details of maneuver duty. I saw confusion, some very bun-

gling work, and annoying delays that were directly brought about by lack of definite instructions covering the case. I fear this left the national-guard troops concerned with a bad idea of artillery methods. The coast artillery could get many ideas along this line applicable to maneuvers from the book by Major Swift. (Field Orders, Messages, and Reports, by Maj. Eben Swift, Twelfth Cavalry.)

III. I recommend in future maneuvers that the attacking force wear a different uniform from that worn by the troops ashore.

IV. I believe it would be much better for all concerned if a limiting time were prescribed for hostilities incident to each phase, i. e., that all night phases begin, say, at 7,30 p. m. and terminate at 11 p. m., at which time all lights to be put out and movements cease, and that day phases begin at 8 a. m. and terminate at 12 noon. It will be easier on everybody, men will be more interested in the duty, more will be learned, and I believe results will be more satisfactory all around.

It will be a hard task to get the national guard enthusiastic over artillery work if, in learning it, they are to be kept at it all night as well as all day.

SUGGESTIONS FOR FUTURE EXERCISES.

[First Lieut. H. U. TOMPKINS, Coast Artillery Corps, attached to U. S. Army torpedo planter *Armistead*, Fort Adams, R. I.]

That the personal contact of enlisted men representing opposite sides be avoided and landing parties be simulated by a very few men.

That every officer participating in a maneuver be previously furnished with orders making clear the point to be accomplished, the general plans, and the specific duties to which he is assigned.

INSTRUCTORS OF SUPPORTS.

[Capt. ALFRED T. SMITH, Twelfth Infantry, U. S. Army, Fort Adams, R. I.]

The association of regular troops and militia in the same camp is the only way to instruct the latter with any degree of success.

No recommendations are offered to improve the means or methods of conducting the exercises of troops engaged in the duty of supports at this post. Every facility was granted by the commanding officer and his staff to insure the accomplishment of much good instruction in the short period allotted for the encampment.

[First Lieut. ROBERT L. COLLINS, Eighth Cavalry, U. S. Army, Fort Adams, R. I.]

I was ordered to assist in the instruction of the Second Regiment Rhode Island National Guard, and was particularly assigned to the duty of superintending the instruction in camp sanitation, drill, and field service of Company C of the above regiment.

The company is well drilled in close and extended order and its officers and men without exception manifested the greatest anxiety to learn and showed an admirable application to duty under very trying circumstances. After being kept up for the greater part of three nights I failed to hear a single complaint from anyone in the company. I consider that the exercises have been of the greatest value to this company, particularly the daily association with the Regular Army and the routine of camp life. If possible, however, the State should be urged to extend the tour to at least two weeks. The company had just become extremely interested in its work and was arriving at a point where each day's instruction was of very great value when it was obliged to break camp.

The sanitary condition of the camp was excellent throughout the tour.

In closing I wish to state that I have never seen a better behaved lot of men than those composing the entire regiment. Disciplinary measures were almost entirely unnecessary. The men of this command would form an extremely valuable addition to our land forces if called into active service.

The discipline, courtesy, and efficiency of the commissioned personnel was of the highest order.

[Comments of the district commander, Colonel HOWE, on Lieutenant Collins's report.]

This report gives details of the uncomplaining manner in which the supports did their duty and also speaks of the

excellent character of the men in the militia at the post during the encampment. Their conduct was certainly exemplary.

[First Lieut. F. W. BALL, Twenty-fifth Infantry, U. S. Army, Fort Adams, R. I.]

I was assigned to duty with Company F, Second Regiment, Rhode Island Militia. My instructions were to supervise the drill, guard duty, camp sanitation, and field exercises of this company.

The officers and noncommissioned officers were assembled and instructed in the manual of guard duty and the infantry drill regulations. It was found they had a good practical knowledge of these subjects, including ceremonies and extended-order drill. Considerable time was spent in explaining and enforcing the methods necessary to prevent soil pollution and the transmission of disease by insects from sinks and water-closets. I believe the officers and noncommissioned officers of this company now fully appreciate the reasons for the methods adopted and will adopt them in their future camps. The messing and cooking of the company was given special attention and the importance of an economic use of the ration and the valuable savings that may be made therefrom were explained.

As a preparation for the maneuvers the company was taken out near the camp the first two days and the duties of patrols explained in detail on the ground. The methods of determining the size of a hostile force when at a distance and the reasons for reporting strength, composition, position, or movement of an enemy when on patrol duty were emphasized.

The company was posted south of the camp as the support of an outpost. The duties of pickets, cossack posts, double sentry posts, sentries, sentry squads, and outpost patrols and the method of occupying the ground in case of attack were explained to the entire company. The details were then made and posted in their positions on a line extending across the island just south of the mortar batteries. This exercise was conducted with reference to an imaginary force which was advancing to attack Fort Adams from the southeast and cut off the garrison from a retreat to the north by land.

The good order of this organization is commendable. If there was a single case of disorder in camp or outside during the time of these maneuvers I failed to observe it or hear anyone speak of it.

It is recommended that a sufficient number of umpires be detailed for the next maneuvers to stop the exercises before the troops came in contact, as the men insist on charging and daring when they are too near each other.

[Comments of the district commander, Colonel HOWE, on Lieutenant Ball's report.]

Attention is invited to the latter part of this report which speaks of the good order in camp, also the recommendation in regard to umpires; both items are concurred in.

COMMENTS OF MILITIA OFFICERS.

[Col. FRANK W. MATTESON, commanding First Regiment of Infantry, Rhode Island National Guard, Fort Greble, R. I.]

Lectures were held daily on subjects connected with the coast artillery service and we owe no small part of the success of our tour of duty to the careful and painstaking work of the officers of the Army to whom this duty was assigned.

If these maneuvers are to become an annual fixture I would respectfully recommend:

1. That this command be permanently assigned to duty at Fort Greble, R. I., so that officers and men may become familiar with their surroundings and so save valuable time.

2. That the tour of duty be made of two weeks' duration, the first week to be devoted to steady drill on the guns and subcaliber target practice, the second week to be devoted to the war game with its various features, and that during this time each fort have three days in which to attack, but only one attack to be made by each fort.

3. That during the existence of hostilities strict guard lines be established and that strangers during these days be only permitted inside the lines by passes issued by proper authorities. This would at least make it more difficult to send spies into the enemy's lines to blow up power houses or tamper with electrical communications, as was done so easily during the past maneuvers.

4. That the troops of the different forts wear distinguishing uniforms during the period of hostilities.

5. That during hostilities officers be detailed to act as umpires at each fort, these umpires to have full knowledge of all the plans of attack and defense of both parties and to meet after an attack has been delivered and review the plans and award their decision.

During these operations it was made clear that the search-light equipment at Fort Greble was not powerful enough to be of material service in actual hostilities. This was especially true of No. 3 light, located on the north end of the island.

It also demonstrated the fact that the companies of the National Guard were altogether too small to successfully man the guns and carry on at the same time the other routine service, such as guard work, old guard fatigue, and details. The companies should have not less than 65 privates and noncommissioned officers.

In closing, I wish to express the thanks of the officers of this command to the officers of the Army on duty at Fort Greble for the many favors, both personal and militia, that were shown us, and especially to the post commander, Maj. John C. W. Brooks, who, by his enthusiasm for his branch of the service, inspired us to our best efforts and from whom we always received the utmost courtesy and consideration.

[Col. CHARLES E. MULHEARN, commanding Second Regiment, Rhode Island National Guard, Fort Adams, R. I.]

In my opinion, this tour of duty has been more effective and instructive to the National Guard than anything the troops of this State have ever experienced. The so-called artillery reserve, consisting of 1 battalion, have become fairly proficient in their duties and the other battalion, acting as artillery supports, has had the very best kind of experience in this line of work. The infantry supports have had a practical training that will be lasting.

The close association of the Regular Army with the National Guard is practical and the benefits are greatly to the advantage of the National Guard, and I believe that this arrangement should be continued and the tour of duty for the future be extended for the period of two weeks.

I wish also to express deep satisfaction on account of the way we were received by the soldiers at this post. Officers and men alike of the Regular Army have made every effort to make the stay of the National Guard most pleasant and instructive and to say that they have succeeded would be stating it mildly.

This regiment, officers and enlisted men, are unanimous in that opinion and all heartily appreciate the soldierly instruction which we have received.

[Maj. HENRY A. JONES, Surgeon, First Regiment of Infantry, Rhode Island National Guard, Fort Greble, R. I.]

The requisition for medical supplies was returned to us with the information that * * * all medical supplies would be furnished by the authorities at Fort Greble, also that cases needing isolation and special care would be cared for and treated at the post hospital. Upon arrival at camp we at once established the Hospital Corps near the post hospital and sought the post surgeon to gain information as to our equipment. He informed us that he had no authority whatever to loan or give any medical supplies without orders. We thereupon made a requisition * * *. This went to the post commander (Major Brooks) and upon his authority the post surgeon furnished us with all necessary medical supplies.

The food and water were plentiful and of good quality. The sanitation of the camp was splendid and the shower baths greatly appreciated by the men.

In view of the fact that suggestions for the improvement of the service are asked for I would respectfully suggest that:

1. Requisition be made at once upon the Government for a complete regimental medical outfit so that hereafter we can go to camp equipped.

2. That there be a commissioned officer sent with the Hospital Corps division hereafter to care for them; also that part of the corps be experienced men and not all raw recruits.

3. That provision be made hereafter for the erection of a field hospital with the regiment in camp, as the caring for

the sick therein furnish, in the making of diets, charts, etc., practical work for the men.

4. That some arrangement be made hereafter to have one-half of the Hospital Corps mess at different times, so that the hospital quarters be guarded and the sick cared for and not left alone. It would seem advisable to have the Hospital Corps mess together instead of with other companies as their occupation is such that they can not always respond to mess call, and thereby save them the discomfort of cold food and trouble with and for the company commanders.

5. That arrangements be made to furnish hot coffee or tea to men who have been called out repeatedly during the night to "call to arms." Especially is this needed when the nights are cold and damp, when the men get wet and tired from their exertions and become chilled.

6. That a change be made in the head gear of the militia for field work in hot weather. In view of the fact that the militia usually consists of men employed under shade, such as in mills, shops, and factories, and that headache is very prevalent among them as soon as they are suddenly put out in the heat and sun for any length of time, we conclude that the felt hat is more or less insanitary, that it is heavy and not porous enough for the circulation of air, and that it adds greatly in many cases to the discomfort of the men, and we would advise that a hat be devised that is lighter, more porous to air, and would suggest straw or canvas for that purpose.

7. We would earnestly suggest at the close of camp that arrangements be made with some laundry firm to thoroughly disinfect all clothing and uniforms and that they be washed and laundried. We have treated men for venereal disease while at camp and their clothing constitutes a grave peril for others who wear them unless they are thoroughly cleansed.

We feel that the medical department of this command has gained much valuable information during this encampment and have only the highest praise to offer for the aid given and the courteous treatment accorded us by the officials of the regular forces.

[Maj. FRANK CANNON, commanding Second Battalion, Second Infantry, Rhode Island National Guard, Fort Adams, R. I.]

My duties were to have a general supervision of the battalion and take command at evening parade. In my opinion the tour of duty was the most instructive to the National Guard that I have ever attended. The officers and enlisted men of the Regular Army did everything in their power to make everything as instructive and pleasant as possible. I believe that these encampments should be continued and would recommend extending the period of encampment to two weeks.

[Maj. JOSEPH C. O'CONNELL, Surgeon, Second Regiment Infantry, Rhode Island National Guard, Fort Adams, R. I.]

The sanitary conditions have been excellent, due to the great care which was exercised in establishing the sinks and baths, and to this I think has been due the absence of illness in the command.

[Maj. C. W. ABBOT, JR., U. S. Army (retired), on duty with organized militia, Fort Adams, R. I.]

While assigned no special duty have endeavored to observe in a general way all that I could. On Monday morning I accompanied the post commander on an inspection of the infantry and artillery camps and watched drill at the mortar battery. I was engaged during part of the forenoon and afternoon assisting in the preparation of the pay rolls, watched the ceremony of muster at 4 p. m., and attended lyceum in the evening.

I frequently visited the camps and inspected the messes. After the first day there was little to criticise adversely in either. The latrine and lavatory arrangements seemed to be sufficient and well adapted to the purposes. Perhaps as good a criterion as any is the universal satisfaction expressed by both officers and men as to the work that has been required of them and the treatment they have received. I may say that they have been enthusiastic in these particulars. My association with them has been so intimate that I believe they have told me what they really felt. In a report prepared as hurriedly as this necessarily has been I do not feel like making either recommendations or suggestions, for they would be hasty and not fully considered. In general, how-

ever, I may say that the tour has given me satisfaction in every particular and I trust that it is but a beginning of instruction to fit the Rhode Island National Guard for what seems to me to be preeminently its proper rôle—that of reserves and supports in the artillery district of Narragansett.

[Capt. WALTER E. HARRINGTON, commanding Company D, First Regiment of Infantry, Rhode Island National Guard, Fort Greble, R. I.]

I think it would have been well to have had a party familiar with the layout assigned to meet each company and direct it to its station. Immediately upon arrival men were instructed to change from dress to khaki uniform and prepare for work.

Details were formed and the first thing done was to get dinner for the men. Wood kitchens had been erected, including sheds with benches, which formed a very suitable place for the men to mess. The food was good and sufficient. The manner of feeding the men was most satisfactory and materially helped to keep them in good health and spirits. The sanitary conditions were excellent. The shower baths proved a luxury and were highly commented upon by the men. In the matter of bedding, however, I would recommend that cots be issued the men in place of bedsacks, which are not wholly satisfactory for raw troops. I would also recommend that the men be issued the brown duck working clothes for use in the pits, etc., as our khaki uniform is not suitable for this work.

In regard to the routine work of drills, etc., I would say that my company was assigned to Mortar Battery Sedgwick. My men found the work on the mortars highly interesting and instructive, although entirely different from anything they had ever experienced. However, they worked hard and conscientiously and, judging from the favorable comments of the army officers, acquitted themselves very creditably throughout the whole tour of duty, and at its close they expressed themselves as highly desirous of repeating the experience should the opportunity again be given them. Personally I believe the experiment was a great success and would strongly urge and recommend the permanent formation of coast artillery companies in the Rhode Island National Guard and other seaboard States.

I was detailed as battery commander and with an observing detail remained at the tower during the tour of duty. The work here, with its highly perfected system, was a revelation to the men at first. They were quick however to apply the instruction given, taking a keen interest in the use of the instruments and in being able to track and plot a target; and after three or four days instruction and practice we were able with our own detachments to make a record of plotting, loading, and being ready to fire on moving target in thirty-eight seconds. In actual target practice with subcaliber load, stationary target, distance 3,200 yards, we made the following 15-shot record. Direct hits, 4; shots striking within a radius of 40 to 120 feet, 8, which, I was informed, with allowance would also have counted as hits and made a total of 12 hits out of 15 shots.

In regard to this work I would say that the men were very enthusiastic and were loath to give up the limited practice. I believe that with facilities in our armories for practice the men could obtain a degree of proficiency that would enable them to properly man and serve a battery should their services be required. I would recommend that each officer be supplied with a copy of the depression position finder pamphlet and also that at least two of the Lewis type B position finders, which I understand are available, together with plotting boards and instruments, be installed in the towers of the State armory at Providence, and that the officers and men of those companies participating in coast artillery work be given opportunity to study and familiarize themselves in this branch.

In regard to the battle exercises, including the plan of attack and defense between the different forces in our district, I would say that I believe they were of immense benefit to all engaged, officers and men alike.

There was a marked interest displayed and much valuable information gained. I would recommend, however, in future problems that competent umpires, with full authority, be attached to both sides, that they may witness the engagements and be prepared to render immediate decisions in the matter of declaring out of action such forces as have unnecessarily exposed themselves or signally failed in their plan of attack or defense.

I would recommend, however, that these exercises terminate at retreat on the day previous to our breaking camp for our home stations in order to allow the men at least one night's rest in which to recuperate from the strenuous duties of the week and leave camp in a more rested condition.

Our return to the home station was over the same lines as those by which we arrived. There was some unnecessary delay on the part of the transportation company and I would refer to my previous statement that I believe transportation by steamer the more preferable.

[Capt. EDWIN T. ARNOLD, commanding Company F, First Regiment of Infantry, Rhode Island National Guard, Fort Greble, R. I.]

Having been assigned to supports, a provisional battalion was formed consisting of Companies E, H, F, and A.

For the first three days the work consisted mainly with the customary formations at ceremonies, interspersed with numerous "calls to arms," when the companies assumed positions to effectively repel landing parties, the establishing of cossack posts being the main feature.

Wednesday, spare time was taken up by throwing up intrenchments on the shore in preparation for the anticipated declaration of war between Forts Greble and Adams.

While not having the opportunity of becoming thoroughly familiar with the duties of an officer of coast artillery on account of having been assigned to supports, the system of lectures carried on while at Fort Greble gave me an insight into the important details that could not possibly have been derived from manuals or any theoretical instruction.

In my personal experience I have never seen the enlisted men so eager to take up the duties assigned them, which shows an interest on their part which is most necessary in perfecting the work involved.

In conclusion, I would recommend that a repetition of tour of duty at Fort Greble be requested as, by reason of being familiar with the location, the work could be taken up more readily than if detailed at some other coast-defense station, and the hearty accord with which the men cooperated with the regular troops and the statements of some of the noncommissioned officers of this command prompts me to recommend that during the next tour of duty the lectures be extended to the said noncommissioned officers more fully.

[Capt. WILLIAM E. MCGANN, Adjutant, Second Infantry, Rhode Island National Guard, Fort Adams, R. I.]

I have no recommendations nor suggestions to make, and I take this opportunity to thank the post commander and the regular officers detailed at this camp for the courteous treatment received this week.

[Capt. JOSEPH P. REILLY, commanding Company E, Second Rhode Island National Guard, Fort Adams, R. I.]

I have the honor to report that my duties while participating in the maneuvers have been acting battery commander and acting range officer, under the supervision of Capt. Richard T. Ellis and First Lieut. Frank H. Phipps, jr.

Myself and the other officers of Company E, Second Regiment of Infantry, Rhode Island National Guard, have been most carefully and thoroughly instructed. I also wish to state that the instruction given the enlisted personnel of the company by the men of the One hundred and tenth Company, Coast Artillery Corps, has covered thoroughly the whole scope of work and has been most beneficial.

I heartily recommend that the joint maneuvers between the Regular Army and the National Guard be repeated annually.

[Comments of the district commander, Colonel HOWE, on Captain Reilly's report.]

This report is of importance because it shows the careful instruction given the officers in the use of the range tower and instruments therein.

All the militia claimed to have had this instruction.

Captain Reilly also wishes to come here for his next camp.

[First Lieut. MARTIN S. FANNING, Quartermaster, First Regiment Infantry, Rhode Island National Guard, Fort Greble, R. I.]

A guard should be maintained by the militia, and during the exercises no one should be allowed within the lines without a pass or without being properly vouched for by some officer.

The opposing forces should wear some distinctive badge or uniform.

Umpires should be appointed and should make a definite decision on the results of the exercises, criticising or praising the plans of the opposing forces.

No private boats or launches should be used during the exercises. A field hospital should be maintained entirely independent of the post hospital. Finally, a regiment or battalion of coast artillery should be formed in Rhode Island, that the practice obtained in camp might be carried on during the year.

A regiment of infantry fifty-one weeks in the year used as coast artillery for one week seems incongruous.

[First Lieut. EDGAR L. BURCHELL, battalion adjutant, First Infantry, Rhode Island National Guard, Fort Greble, R. I.]

During the afternoon I was shown over the post by the commanding officer and in the evening attended a lecture delivered by Major Brooks on "General Duties of Artillery Commanders," "The Organization of an Artillery District," etc. These lectures were continued throughout the week, each officer on the post contributing something pertaining to the artillery arm of the service. They were illustrated by use of the blackboard and were very comprehensive, embracing everything from powder and primers to 12-inch mortars and disappearing guns, including telephones, the telautograph, searchlights, and submarine mines. These lectures were highly interesting and instructive.

The first few days I was unassigned, my duties being simply to observe. Through the courtesy of the post commandant I was permitted to visit any and all parts of the reservation, which I did, and I found the officers of the post always ready and willing to give me all the information they could relative to guns, searchlights, defenses, etc. On Wednesday I was assigned to Battery Hale as battery officer, and acted as such the rest of the week, receiving instruction in the duties of the office from Captain Taylor, the battery commander, who was very patient and painstaking with me. Aside from my duties as battery officer, I was on Thursday morning detailed to assist Lieutenant Green in placing targets and recording shots in subcaliber practice with 10-inch guns and mortars. We towed the targets out some 2,000 yards or so and laid to about 300 yards off to one side, out of range, to record the shots. The experience I found to be quite novel and pleasant.

On Wednesday and Thursday nights the "call to arms" was sounded on several occasions and I reported to my battery each time; in each instance the battery was manned and reported "in order" in an incredibly short space of time. On Thursday night the fleet of the attacking force, which had been "picked up" by our searchlights, was reported to be trying to effect an entrance. When within range we opened fire upon them, which was returned, and I was afforded an opportunity to witness the beautiful spectacle of an artillery duel at night.

On Friday and Saturday nights I accompanied the forces to attack Fort Adams. Friday night we simply made a reconnaissance, but the following night we succeeded in landing troops to assault the garrison on the land side, while we steamed by, engaging the fort on the water side. The engagement lasted until almost dawn and was a magnificent sight to behold. On each occasion I remained on the steamer as an observer.

We broke camp the next day—Sunday, July 14—crossed on the ferry to the mainland, entrained the troops at Saundertown and left for Providence, which was reached in the evening, where the troops were ordered to their home stations and dismissed, thus completing the most successful and pleasant tour of duty the regiment has ever had.

There is not the least doubt but that the whole regiment was greatly benefited by the tour. The regulars fraternized with the guardsmen and our men gained considerable knowledge of customs of the service thereby. I consider the week to have been very profitably spent and the instruction and experience received to be of inestimable value to the regiment, but in order to make this tour of lasting benefit to the regiment they should be continued; that is, they should take the place of our annual brigade encampment, and I most respectfully recommend that this be done. If it be the intention of the War Department to use the national guard of the seaboard States in coast defense work in time of war, the recent tour can not help but be of incalculable benefit to both officers and men, but if not, then I fail to see wherein this tour was worth the time expended.

Under the head of recommendations I would respectfully say, that owing to the fact that this State has considerable

coast line, and also is of some strategical importance in having a naval station and other military works, and having two or three forts equipped with modern armament, providing an admirable training school for troops, I most respectfully recommend that one of the infantry regiments, or one battalion at least, be drilled and equipped as coast artillery, thus providing a nucleus for a larger force when required. I also recommend that an officer of the Coast Artillery Corps be detailed at least one evening a month throughout the winter to lecture before the Officers' Association on the artillery branch of the service.

In conclusion I wish to thank Major Brooks and his officers for the very many courtesies extended me. Major Brooks and his officers were more than kind and generous in entertaining me, in consequence of which this tour has been both instructive and pleasant to me.

[First Lieut. HENRY A. CROSBY, Company D, First Infantry, Rhode Island National Guard, Fort Greble, R. I.]

I will say that, it being an entirely new drill for us, it seemed rather hard at first, but with the assistance we received from the regular troops stationed at the battery we soon obtained knowledge enough to be able to man the guns in very good shape. I think the work of coast artillery is just the proper thing for all States that border on the coast to take up and to be able to defend themselves at these points. I would recommend that the State of Rhode Island do away with its usual encampments and adopt the work of coast artillery. The men of my command are all in favor of the new work that has been assigned them and are very much in favor of doing away with their usual camp for this kind of work. I do hope that the joint coast defense exercises will be repeated, as I believe the coast defense practice is the only practice to have.

[First Lieut. PATRICK J. SULLIVAN, chaplain, Second Infantry, Rhode Island National Guard, Fort Adams, R. I.]

I served as chaplain of the Second Regiment Infantry, Rhode Island National Guard. My duties during the encampment were priestly duties. I am pleased to state that the present encampment was the best I have attended.

[First Lieut. WILLIAM H. MAGILL, assistant surgeon, Second Regiment Infantry, Rhode Island National Guard, Fort Adams, R. I.]

My duties consisted of caring for the sick and injured members of said command and daily inspection of the closets, baths, kitchens, and kitchen sinks.

There was but little sickness during the encampment, none of which was contracted during this encampment.

The injuries were but slight and all but two are now entirely recovered, and the two spoken of practically cured.

I consider that the sanitary conditions have been excellent. The closets, sinks, and baths were established with care and thought. This fact I consider to have been a very important factor in preventing illness in the command.

[First Lieut. BENJAMIN C. BAMFORD, battalion adjutant, Second Regiment Infantry, Rhode Island National Guard, Fort Adams, R. I.]

I have the honor to report in regard to my tour of duty at this fort that I went out on guard mount two mornings, took part as an observer at the attack on this fort on the morning of July 10, in the same capacity on the attack of Fort Greble, and at the attack on this fort on July 12.

I think that annual encampments should be held at U. S. army posts, as more knowledge can be obtained at the posts in the short while we are here than any number of encampments at State camping grounds.

In conclusion, I wish to state that the four regular army officers detailed here as our instructors have on all occasions been ever ready to give advice whenever asked and with their gentle, manly manner, and courteous treatment should be well commended.

[Second Lieut. C. F. MARTIN, Company A, First Regiment Infantry, Rhode Island National Guard, Fort Greble, R. I.]

The part taken by Company A was necessarily very small, acting as they did as one of the support companies. The tour as a whole I consider one of our best, giving both officers and men a practical knowledge of defense and attack. I feel that the reserve force used to repel landing parties was much too small, as the points of landing were numerous and there were not men enough to keep in communication.

STATE OF CONNECTICUT.

Artillery District of New London.

[Date of exercises: July 15 to 26.]

COMMENTS OF REGULAR OFFICERS.

[Col. C. D. PARKHURST, Coast Artillery Corps, commanding the artillery district of New London, Fort H. G. Wright, N. Y.]

CAMPS AND THEIR PREPARATIONS.

At each post cook houses, mess shelters, mess tables, latrines, lavatories, and bath houses were built, running water was laid on to all camps, and electric lights put in for officers' tents, first sergeants' tents, the cook houses, company streets, and latrines.

All camps were ready for occupancy before July 15.

SANITATION AND POLICE.

In general it appears that this was made as prominent and perfect as its importance demands. As was to be expected there was carelessness, due to ignorance, at the start; but the sanitary officer kept after these matters and all soon learned as to the importance of correct sanitation. That there were no swarms of flies about the camps and no sickness tells the story of the cleanliness of all the camps.

TRANSPORTATION.

There was no hitch in rapidly transporting all the Connecticut National Guard to New London, and from there to the three posts—Fort Mansfield, Fort H. G. Wright, and Fort Terry. The same may be said as to getting away after breaking camp on the 26th.

INSTRUCTION.

There was a little groping in the dark at the start as to just what to do. But this at once resolved itself into a coherent plan of operations, which was taken up and carried out successfully during the entire camp.

It is to be remarked with regret that none of the companies that came to Fort H. G. Wright had their muster and pay rolls ready, complete, and correct for the necessary and prescribed muster. Musters had to be made from check lists, as in the old days of Indian campaigns, in order that they might be a muster at the time called for. It was not until Sunday, the 21st, that all rolls were finally in and forwarded to the chief paymaster; * * * every effort was made to get this work done; it was not neglected, but it probably was ignorance as to what was wanted that caused the delay.

The reserves at the guns had complete instructions by the battery officers; the supports had problems for their execution, as set forth in accompanying reports. All seemed particularly zealous and anxious to obtain knowledge and the rapidity with which it was grasped speaks well for the good intelligence of the rank and file.

DISCIPLINE.

This deserves all praise; no serious breach of discipline occurred to mar the harmony of the occasion; no summary courts were needed. The men were quiet, orderly, respectful, and self-respecting in manner at all times. Good fellowship and comradeship were conspicuous at all times, and everything, either on duty or at recreation, moved harmoniously without any disturbance that I either saw or heard of.

THE PROGRAMME.

The reports of all the post and subordinate commanders are so complete that there appears to be no necessity for any extended comments by me. Suffice it to say that there was not a hitch in its execution.

INFANTRY SUPPORTS.

The rôle of these supports at any one of our island posts is naturally and necessarily very limited and the instruction had to be extended beyond the actual requirements of the case to keep up the interest and vary the monotony. I was importuned to allow exercises to be extended to cover the whole island and also to use the troops of one island to embark and go to the attack of some other island.

CONCLUSIONS.

In every way the camps appear to have been a very great success. Except for the lamentable accident at Fort Terry, not a single thing of any magnitude marred the smoothness and harmony of every occasion. I believe the cost of the camps has been money well spent, the benefits to all that have been derived being incalculable. It has been my duty as well as pleasure to express my hearty commendations to all in a general order and in special letters to all concerned, and it is my sincere desire and hope that next year may find the same commands again united in a similar set of camps.

[Comments of department commander, Maj. Gen. F. D. GRANT, U. S. Army.]

[Eleventh indorsement.]

HEADQUARTERS DEPARTMENT OF THE EAST,
Governors Island, N. Y., October 15, 1907.

Respectfully forwarded to the Adjutant-General of the Army, Washington, D. C.

1. In view of the fact that I had been assigned to no active part in these maneuvers, I decided to take none, and therefore must base my comment and recommendation almost entirely upon the reports.

2. In the reports some features are noteworthy:

(a) The general tone of militia expression is little less than enthusiastic.

(b) The reports are not free from accusations of too great haste and too little preparation of what perhaps might have been provided.

As to (a), there are only one or two (and these trivial) discordant notes in what is virtually a chorus of praise. Reorganization of much of the Connecticut Militia into an artillery reserve seems to be in the air, and where these initial results have given such general voice to expressions of esteem and respect between regular and militia forces it is manifest that the experiment is a success. Many recommendations are brought out with a view to continuing this success. These recommendations are salient features of the district commander's report and abstract.

As to (b), the scheme for next summer's work may well be started now, and I think that so far as New London district is concerned it would be wise to place the preparation of plans and problems in the hands of a board to consist of Col. C. D. Parkhurst, Coast Artillery Corps; Lieut. Col. C. G. Woodward, Coast Artillery Corps; Capt. F. G. Mauldin, Coast Artillery Corps; Capt. F. K. Fergusson, Coast Artillery Corps, and either Capt. H. A. White, Eleventh Cavalry, or Capt. Duncan K. Major, jr., Twenty-seventh Infantry. It would be well also to invite Col. Gilbert Fitch, of the Third Connecticut Infantry, to join in the work. I of course understand that limited time and the experimental nature of the work in this instance did not permit of such preparation.

Pending completion of this initiatory work the indoor instruction during the winter of the militia might advantageously proceed, and for the purpose they should be equipped with material and educationary pamphlets and should be furnished with one or more officers from the nearby district to superintend the work.

The subordinate reports that are sent forward by reason of what I consider their importance should receive consideration in their entirety.

In conclusion, I would suggest that the Navy or the naval militia, or both, might be given work in connection with these maneuvers, both as representatives of a hostile fleet and of the equally necessary scout and patrol boats, and I think perhaps the nearby yacht clubs would be glad to join in the game for the sport of it.

I think, too, that in view of the spirit shown, a more definite assignment of the regular artillery units to the locality in which they serve is in order, and that such units should in every case be coupled with a reserve unit of the militia carrying out the same function pertaining to the fixed defenses.

High praise is due to the infantry and cavalry officers who have aided in the work with the supports during these joint exercises and to the artillery officers assigned to the work of simulating a hostile fleet. The ideas of these officers gained by their experience can not but be valuable, not only in any

future maneuvers, but in any contemplated change of the nature of the defenses themselves.

I also commend to the War Department the zealous and painstaking work of the district commander, the several post commanders, and other subordinate officers.

[Lieut. Col. CHARLES G. WOODWARD, Coast Artillery Corps, commanding Fort Terry, N. Y.]

Instruction in the batteries at stations or guns practically continuous. Subcaliber practice noon of 18th to 6 p. m. of the 19th. Scores very good and interest taken in all matters gives promise of profitable results in the future. Experience interesting and instructive, personnel orderly and full of zeal, and results obtained all that could be expected from the short period of training possible for the artillery reserves and supports.

Hearty good will and comradeship shown by all officers and men, earnest desire to learn and understand shown by militia, and equally earnest endeavor of all regulars to aid by word and example created from the beginning. A sentiment of mutual respect and consideration that will go far toward making joint exercises successful in the future. Would be expedient to detail same companies as reserves at the same posts or at same kind of guns at other posts for at least three successive years.

[Maj. C. J. BAILEY, General Staff, observer of exercises.]

The object of these exercises is to utilize the militia as an adjunct to coast defense in two ways: As artillery reserves working at the guns with the regular garrison, which is not and probably never will be of sufficient strength to man the work completely; as artillery supports to defend the immediate vicinity of the works from raids by landing parties or other small forces.

It is proposed to report on the manner in which this object was carried out at Fort H. G. Wright without going greatly into details of the various exercises, which will be fully described in reports of officers serving in the garrison.

ARTILLERY RESERVES.

One of the two companies of the Connecticut coast artillery was assigned to a mortar battery and the other to a 10-inch gun battery. The officers and men displayed much interest in the work and developed an aptitude for it. Connecticut is so devoted to manufacturing interests that the men are largely familiar with machinery and are attracted by the work at the heavy guns.

I was particularly impressed with the views of the officers of the two companies as to the success of the experiment. These reserves must come to the forts as separate companies. The field officers must, at least for some time, give up their direct command over organizations and must be assigned duties as assistants to officers of corresponding grades in the regular garrisons.

I took occasion to obtain the views of the major and the officers of this little battalion and found that they were enthusiastic over the work of the exercises and as one of them put it, "we hope from our experience to induce other companies of the guard to come into the coast artillery next year."

I believe that the interest taken in them by the officers and men of the regular garrison and the treatment shown them has been of great help and that they realize from the nature of their duties that the adopted system is all that could be asked for at present.

These companies need more facilities for armory work in position-finding service and gun drill, particularly the former. The major asked me if plotting boards, range and deflection boards, etc., could not be supplied for work during the year at home.

There is a strong sentiment in favor of these exercises and I am convinced that it will grow as a result of this year's experience.

ARTILLERY SUPPORTS.

The only criticism of any importance I can make of the use of these troops during the exercises at Fort H. G. Wright is that too much time was given to coast artillery features alone and not enough to combined exercises utilizing the supports.

The point emphasized is that while the supports were benefited by practical field work, most of it had no direct connection with the exercises going on at the guns and did not appeal sufficiently to the militia as being a necessary feature of coast-defense work. Each problem should, it is believed, have been one where the land defense was the dominant feature, one that would show the supports the necessity for their employment at the fortifications, and while exercising the reserves sufficiently at the guns would subordinate the more advanced artillery element of the defense as much as possible.

To carry out the object of the exercises so far as supports are concerned they should be sent for the present to posts where sufficient ground is available, either owned by the Government or given or hired for the purpose. They should where possible occupy and maneuver over the ground that will in war be the line of defense or over ground in the immediate vicinity of the forts. If this can not be done it will be better to send them to other posts where these conditions are fulfilled.

In conclusion it is believed that these exercises were as successful this year as could be expected, where all concerned were engaging in a practically untried experiment, that they are the beginning of a most important part of the national defense, and that they should be encouraged to the fullest extent by the War Department and by the officers and men of the Coast Artillery.

To this end every effort should be made by district and post commanders to interest the militia, and the officers of the latter should be encouraged to submit their views of the programmes as laid out and those of higher rank should be consulted frequently and be made to feel that they are occupying positions of responsibility. The officers of the reserves should be assistants in fact to battle, fire, and battery commanders; those of the supports, which bring to the exercises their regimental and battalion organizations, should be allowed much latitude in the measures of land defense, retaining as much command as possible over the intact organizations.

[Maj. OSCAR I. STRAUB, Coast Artillery Corps, commanding Fort Mansfield, R. I.]

The behavior of the officers and men was excellent, none but very minor infractions of discipline occurred and then mainly through ignorance. There were no summary court trials.

The zeal and attention to duty by both officers and men was of high order. All appeared interested in the instruction, work, and duties assigned and strove to learn. Progress in instruction made was very satisfactory.

The discipline and behavior of the men of the Eighty-eighth Company, Coast Artillery Corps, was excellent throughout the encampment.

The noncommissioned officers were utilized as instructors for the noncommissioned officers and privates of the "artillery reserve" company.

During the attack and defense period the command was prompt in responding to "call to arms" whenever sounded and their duties were carried out with zeal and efficiency.

It is recommended that the same companies be assigned from year to year for "artillery reserve" duty, that such companies be furnished artillery drill and text books and the simpler appliances for instruction in their armories, that the officers be sent for a day or two every quarter for instruction at nearest artillery posts, and that the noncommissioned officers be examined for qualification as first and second class gunners after proper appliances for armory drill and study are furnished.

[Capt. F. G. MAULDIN, Coast Artillery Corps, commanding U. S. Army torpedo planter *Gen. Henry Knox*, in charge of fleet.]

The general programme of the work for the entire period of the exercises was stated in the "Instructions for senior officer in command of fleet," and it was my duty to arrange the details and see that the programme was carried out as specified.

For convenience in maneuvering the fleet a system of signals was prescribed and the fleet was organized by being formed into two divisions.

The operations for each day were divided into phases, and detailed instructions for each phase with a statement of the object intended were issued each day in a series of fleet orders.

[Capt. F. K. FERGUSON, Coast Artillery Corps, commanding U. S. Army torpedo planter *Col. George Armistead*.]

These maneuvers were very interesting and very instructive. Weather conditions that prevailed were nearly perfect, permitting the work to be carried out as prearranged, which in itself materially assisted the instruction features of the programme.

I offer suggestions for improving the value of the maneuvers as follows:

I believe it would be well to arrange the phases so as to be progressive in their nature.

In the maneuvers just closed the first day's work was an attack on the rear of batteries at Forts H. G. Wright and Terry, whereas on the second day the location of these batteries was determined (supposedly) by a reconnaissance in force. A reversal of these phases would have been better, I think; in fact, I believe the first phase of every "maneuvers" should generally be a reconnaissance in force, to develop the strength of the defense and locate positions of batteries.

Exercise of the observers, plotters, searchlight operators, gunners, etc., in changing targets, in identification of targets, etc., when many vessels are in the field of fire is most important instruction. Inasmuch as it is rarely the case that more than one vessel is available for this work, particularly at night, I suggest that fullest advantage should be taken during the maneuvers, to give all instruction in this line possible. It is suggested that each night phase be planned with a view of having all vessels in the field of fire at some one time, so that this instruction of the garrison may be practiced. Observers, plotters, searchlight operators, gunners, etc., have practically no opportunity to perform their functions when vessels are maneuvering in "dead angles" It is therefore suggested that only a part of a fleet should be in a "dead angle" at one time. At Fort Mansfield during the three phases comparatively little instruction could be given the details in the position-finding stations with battle

ships in the field of fire, owing to the fact that they were generally in a "dead angle."

Training the searchlight operators in searching work is important. It is thought a good plan, during at least one night's phase, to have all vessels go out, say, about 12,000 yards, then scatter, and later approach from all possible directions.

The searching work of the operators generally appeared to be excellent. At times, however, several failures to pick up vessels was thought to be due to too rapid motion of the beam in azimuth.

[First Lieut. GEO. L. WERTENBAKER, Coast Artillery Corps, quartermaster, artillery district of New London.]

These two men—Mr. A. George Stewart, clerk, and post Quartermaster-Sergeant A. L. Gunther—have been indefatigable and untiring in their labors, willingly working overtime, including Sundays, and too much credit can not be given them for the efficient and cheerful manner in which they have performed their work, and the success of this movement is in no small degree due to them.

In arranging for the transportation of the "militia" companies this office attempted to make arrangements with the New York, New Haven and Hartford Railroad, and my predecessor here, Capt. R. W. Collins, Coast Artillery Corps, wrote several letters to the railroad authorities requesting cooperation, and after taking charge of the office I wrote several letters with the same end in view, but only one letter was received in reply and that merely stated that the matter could be taken up in a few days.

This necessitated the issuing of first-class limited transportation requests to the several companies concerned, leaving in their hands the securing of cars at their home stations. This was accomplished without difficulty, with the exception of two instances, where the local agents refused to cooperate with the militia officers regarding baggage cars. However, in response to a telegram from this office the assistant passenger agent at New Haven issued the necessary instructions, and what at first bid fair to prove a disagreeable complication was avoided.

In arranging for the return of the troops we were able to arrange for two special trains with baggage cars. These trains were made up so as to drop the cars from the rear of the train as they arrived at the home station of the company occupying them. Each car was labeled with the name of the city at which it would be cut off from the train, as a guide to the troops while entraining at New London.

[First Lieut. THOMAS DUNCAN, Coast Artillery Corps, battery officer, Battery Stoneman.]

Joint exercises were a success, and did much toward strengthening the friendship and respect of regular troops and the Connecticut National Guard for each other.

[First Lieut. JOSEPH E. MYERS, Field Artillery, battery officer, Battery Bardford.]

Reserve company (Company K, Third Infantry, Connecticut National Guard) performed its duties very well and men and officers showed great interest in their work.

[First Lieut. W. R. BETTISON, Coast Artillery Corps, range officer, Battery Steele.]

Company B, Third Infantry, Connecticut National Guard, furnished a complete range detail. On the 18th had sub-caliber practice with very satisfactory results at both fixed and moving targets. All Connecticut National Guard are enthusiastic over the work, anxious to learn, and did learn in remarkably short time. Hope they will be sent to same work next year.

[First Lieut. JOHN S. PRATT, Coast Artillery Corps, Fort Mansfield, R. I.]

The men of the militia artillery reserve company were much interested in the artillery work proper, and from my personal observations many of them were desirous of coming again to the joint exercises as artillery reserves.

It is respectfully recommended that the militia be furnished with literature on elementary artillery subjects. They reported absolutely ignorant of all artillery principles, a state of affairs which could have been obviated had they been previously supplied with elementary books on the subject.

[Contract-Surgeon L. R. DUNBAR, surgeon, Fort Terry, N. Y.]

McCall incinerators not ready until twenty-four hours after arrival of command, due to delay in receipt of parts ordered as early as April 24, 1907. Found to be satisfactory, free from odor and sanitary. Recommends to burn out incinerator at times when least in use—when men at drill.

INSTRUCTORS OF SUPPORTS.

[Maj. SAMUEL H. BOUGHTON, Eleventh U. S. Cavalry.]

Recommended that programme for supports be prepared in advance.

Artillery supports to be given greater opportunity to engage in actual defensive work.

Commends Colonel Dorsey and officers and soldiers of his command. Always courteous and ready to answer any call and anxious to become familiar with duties.

[Comments of district commander Col. C. D. PARKHURST, Coast Artillery Corps, on Major BOUGHTON and his assistants.]

It is plain that Major Boughton and his assistants arranged a fine set of problems on Plum Island.

[Capt. HERBERT A. WHITE, Eleventh Cavalry, U. S. Army.]

Assisting in the instruction to be given the militia infantry assigned as artillery supports. In this work I was assisted by the following officers: Capt. Stanley H. Ford, Fifth Infantry; Capt. Duncan K. Major, Twenty-seventh Infantry; Second Lieut. R. E. Fisher, Fourteenth Cavalry.

Besides these problems which were worked by the battalion, the colonel of the Third Connecticut, the major commanding the second battalion and his staff, and two of the signal corps company's officers made what may be considered a staff ride in automobiles over the entire island. There was also a terrain exercise for all officers of the infantry, given with a view of training them in the work of defending the reservation from a landing party from the west.

Instruction was also given to the infantry officers in field orders and in rapid sketching, and to the entire battalion in patrolling and in intrenching.

Too much credit can not be given to the enlisted men of this command for the intelligence and interest displayed during the maneuvers. The same remark can apply to the officers. I found among the latter a lack of knowledge of paper work. They are not very conversant with the methods of filling out muster and pay rolls nor with official correspondence. As little paper work as possible was required of them, and I am at a loss to see how any less could have been required. We hear quite a good deal of caviling at red tape in the Army, but I am unable to suggest any better methods than those at present used, and militia officers must be made to understand that the National Government must have an accurate accounting for its money and property.

In the matter of taking over by patrols and advanced parties I have only the highest commendations to record. In this matter the battalion acquitted itself as creditably as any regular organization.

As for discipline, I should rate it about the same as that of an ordinary battalion of Regulars, neither better nor worse.

THE NATIONAL GUARD ARTILLERY.

This force consisted of the First and Second Companies, Connecticut Heavy Artillery. Their work was mostly confined to work with the batteries, though in problem No. 4 these two companies took their rifles and acted as infantry, acquitting themselves creditably. The command seemed to be well disciplined. As to their efficiency as heavy artillery I am not in a position to state.

The Connecticut militia has one company of signal corps men. As I have paid considerable attention to this corps in the Regular Army for the past two years I was much interested in this militia attempt. The men of the Connecticut Signal Corps are organized into a company for convenience. The company has four officers—1 captain, 2 first lieutenants, and 1 second lieutenant—and 53 enlisted men. This company usually does the work for the Connecticut Brigade.

This is an excellent organization and its value to the National Government at the outbreak of a war will be incalculable. It can run lines now with great rapidity, and when equipped with apparatus that does away with the necessity

of transporting lances and with cavalry buzzers and becomes somewhat familiar with what the usual requirements of the field of action are this company will answer all requirements. Such an organization deserves lots of credit and all encouragement that the National Government can bestow.

PAPER WORK.

In this the organizations were deficient. Considerable difficulty was experienced in getting the muster and pay rolls in any kind of shape and I could see an unfamiliarity with paper work in general. The National Guard of Connecticut has a number of officers as paymasters. One of these was at this post, but he was of little help to the organization commanders.

Recommend, as advocated by Colonel Fitch, commanding Third Regiment Connecticut Infantry, that a retired sergeant be detailed at full pay with each national guard regiment. This man could act as sergeant-major of the regiment and also act as instructor of the company commanders and their company clerks, going from one company to the other during the year. Then I believe that the organizations would soon become familiar with army methods and much of the time and worry attendant on trying to secure proper paper work from national guard organizations would be eliminated.

It was found that the organizations had no extra rolls whatever. This caused a great deal of work in erasures and changes on rolls. It has been my experience that muster and pay rolls are quite formidable objects to national guard organizations, so that the first roll, always full of mistakes, can be used for corrections, then an entire new set be made out and the first one thrown away. Moreover, in this district the field and staff were separated, necessitating two sets of pay rolls, one for each post, and the same as to the medical detachments. This should have been foreseen and the proper number of pay rolls furnished for such a contingency. I was informed by the Connecticut paymaster that no extra rolls whatever were furnished him. Whether this was the fault of the adjutant-general's department of the State of Connecticut or the fault of the National Government I do not know.

The work of the militia supports, that is, the infantry supports, in guarding the batteries is but that of guarding any base. It is no different than that of guarding a base of supplies. The guns are nothing different than commissary supplies or quartermaster stores. Hence the problem for the infantry is that of plain defense of a certain position. This being so, the instruction of the infantry does not vary in the least from that given on the defense at any place.

The instruction received by the battalion at this post was so infinitely superior that there can be no comparison, yet I consider the instruction received here as far short of what it could and would have been had we had sufficient terrain to work over, as that at Niantic, the State encampment ground of Connecticut, was short of what was actually done here. It has been so clearly demonstrated that maneuvers for the National Guard is the only instruction worth while to the National Government that every attempt be made to get the National Guard into extended maneuvers wherever possible.

I have derived great benefit from the work of the past two weeks. I believe the Government will be amply repaid in time for the expense attendant upon the Leavenworth school officers having been detailed to the artillery maneuvers. Coast artillery problems and work have been but illy known among the officers of the other branches and a broadening has taken place that can only be most beneficial to all concerned. And I may say that the utmost courtesy has been experienced by myself from both the artillery officers of the Regular Army and from the militia officers with whom I have been thrown in contact.

[Comments of District Commander Col. C. D. PARKHURST, Coast Artillery Corps, on Captain White.]

I wish to record my sincere appreciation for Captain White's very valuable services; he labored early and late to assist in making up pay rolls that should have been all done and finished when the companies arrived, and in giving instruction in field problems.

[Capt. STANLEY H. FORD, Fifth Infantry, U. S. Army.]

The fact that all field exercises for the artillery supports had to be restricted to the limits of this small reservation made it difficult to give the instruction the militia has a right to expect in a period of ten days. It is believed that in the instruction of militia there should be as little call on the imagination as possible. The factor of imagination, it is thought, played too prominent a part in the artillery problem in which the infantry supports participated on the 22d instant, because it was merely assumed that the enemy would attempt a landing at the Government dock on the reservation, whereas such a point would probably not be selected for such purpose.

[Capt. CHARLES BROOKS CLARKE, Fourteenth Infantry, U. S. Army.]

Believes better results would have followed actual landing parties; time not used to best advantage for want of advance information as to just exactly what is to be done.

[Capt. DUNCAN K. MAJOR, Jr., Twenty-seventh Infantry, U. S. Army.]

I addressed the officers on "camp sanitation," "orders," the officers and noncommissioned officers on "field fortification," and the noncommissioned officers on "patrolling." In the several problems I acted as umpire * * * and gave instruction to the officers in sketching.

The problem facing artillery supports is simply that which would face a force of infantry to whom had been intrusted the protection of warehouses, in other words, the taking up of an intrenched position.

The organized militia (Companies D, F, H, L, Third Infantry Connecticut National Guard) on duty at this post have displayed great enthusiasm in their work and made my duty with them a pleasure. They were ever willing and desirous of learning the tricks of the trade and a body of men imbued with such a spirit should be quickly whipped into a first-class fighting force. Their close-order work was rather ragged, a defect which should be remedied at their armories rather than during the encampment. In the solution of the various problems the officers seemed to appre-

ciate the situation generally and meet it, and while at times the extended order was not all that could be desired it was very noticeable that great care was taken by officers and men in the use of cover.

During the entire encampment there were only two maneuvers, properly speaking, for the artillery supports in the general maneuver scheme.

When infantry and cavalry officers are detailed at artillery posts for the above duty they should be given entire charge of the instruction of the supports, subject of course to the approval of the post commander, the senior arranging a detailed programme of instruction to cover the encampment period. There should be theoretical instruction of officers and noncommissioned officers in security and information, military tactics, field fortification, sketching, followed by problems worked out on the ground and illustrating the principles enunciated. There should be extended-order drills in which every attention should be paid to detail. There can be no better training for the men than to be camped with regulars, for there are many details and customs of the service which can only be learned by actual contact of the two forces.

As far as I am personally concerned at this post by seeing the coast artillery defenses and drills, contact with the other arms tends to broaden an officer's views.

[First Lieut. JAMES E. WARE, Fourteenth Infantry, U. S. Army.]

Not much knowledge as to tent pitching; did not know how to handle rations to best advantage; green coffee issued and complained about; equipments of company complete; only one service uniform, should have two; had dress uniform in camp; close-order drill not good; extended-order drill not very good; all worked hard during camp and showed marked improvement.

COMMENTS OF MILITIA OFFICERS.

STATE OF CONNECTICUT,
MILITARY DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Hartford, September 24, 1907.

SIR: * * * I sincerely trust that before another drill season Connecticut will furnish from twelve to fourteen companies of coast artillery instead of two.

Very respectfully,

GEORGE M. COLE,
The Adjutant-General.

The CHIEF OF ARTILLERY, U. S. Army,
Washington, D. C.

[Col. GILBERT L. FITCH, commanding Third Infantry, Connecticut National Guard.]

I believe it would be advisable to prescribe ceremonies in dress uniform, provided, of course, it does not interfere with field work. I do not wish to be understood as advocating "fuss and feathers," but I do know that the average militiaman looks forward to an opportunity to show the company from "Podunk" that the "Squedunk" company makes the finest appearance on parade, and as the annual "tour" is the only opportunity they have of even assembling by battalions I believe it advisable. The satisfaction derived offsets any question of extra duty. In districts where organizations are located in large cities this would not apply.

That all future encampments of the organized militia, even though held at regularly established State camps, be under the direct supervision and instruction of regular army officers and that at least one-sixth of the force so encamped be made of regular troops.

That all forms required by the Organized Militia when under Government orders, such as field returns, muster rolls, pay rolls, etc., be issued to our officers while at their home stations so that they could become familiar with them.

That the War Department detail a retired noncommissioned officer, experienced in paper work, permanently with each regiment to act as sergeant-major; he would not only relieve the commanding officer of many details in connection

with paper work, but could be used to instruct company clerks in their duties, and in fact be utilized in other directions in promoting the welfare of an organization.

That future tours of duty begin on Saturdays for the reason that the majority of men have a half holiday on this day, and it is much easier for them to arrange to get away for ten or twelve days when a tour of duty begins on Saturday.

That army officers upon noting things which are open to criticism make them known at once so that an organization may immediately receive the benefit of same; furthermore, that they have no hesitancy in freely criticising everything which will in any way benefit an organization. I firmly believe if this were followed out that a vast improvement would be shown, as when criticisms are not forthcoming we are apt to feel that we are beyond redemption, whereas, on the other hand, they inspire officers and men to do better work. This was very clearly demonstrated to me by this tour of duty.

That, in so far as it is possible, the same officers be detailed to inspect and instruct an organization year after year.

That where latrines are constructed the faucets be so arranged as only to turn on with the aid of a wrench, which can be held by the sanitary squad. It was noted that latrines were rapidly filled with water in some instances, but it was impossible to detect anyone turning on faucets.

I can say that the minor problems submitted by Captains White, Foard, and Major and Lieutenant Fisher were enthusiastically received and I believe every man did his best to avail himself of this opportunity to learn. These officers possess the tact and qualifications so necessary in instructing organizations of the militia and won over every individual of this outfit by their ever apparent interest in them. Too much credit can not be given them for their untiring efforts. It is earnestly requested that these officers be detailed with the command next year; if not all, especially Captains White and Major, whom I personally saw more of and whom I consider to be ideal instructors. While the duties of Major Bailey and Captain Lenehan of the General Staff Corps were of a different nature they seemed to manifest the utmost interest in my command and I am indebted to them for many

valuable points, as well as to the officers of the post, who while we were not brought in contact with so frequently in an official way, not any part of this battalion acting as reserves, were most painstaking in giving us such instructions and information as we sought and were particularly pleasant to us in a social way.

I earnestly hope that this command may be fortunate enough to be assigned to a similar tour of duty with you next year.

In closing I desire to express my appreciation of the manner in which your district quartermaster, Lieutenant Werdenbaker, so promptly cooperated with me in every instance.

[Maj. JAMES J. HELEY, Third Infantry, Connecticut National Guard, commanding First Battalion.]

That companies of his battalion be furnished with apparatus for indoor instruction. Annual inspection to be made by artillery officers. Removal of all old unsightly "shacks" that now line north side of the island. Information and instruction received has been of great benefit.

[Maj. VINCENT M. KING, Third Infantry, Connecticut National Guard, commanding Second Battalion.]

Informal talks after each problem; these are very instructive and have given both officers and men a better idea of field service.

[Maj. HADLAI A. HULL, commanding Coast Artillery, Connecticut National National Guard.]

Health of command exceptionally good; only few minor cases of intestinal derangements. Sanitary arrangements were satisfactory; water supply abundant and wholesome; meat and bread rations issued uniformly fresh and good; latrines and lavatories left nothing to be desired from sanitary point of view; not the slightest odor noticeable during sultry weather. Acknowledges courteous and useful cooperation from post surgeon.

[Maj. HADLAI A. HULL, commanding Coast Artillery, Connecticut National Guard.]

The health of my command during the entire tour of duty was excellent; not a man reported with illness of any consequence.

I think the sanitary conditions were exceptionally good. Dr. Black, of the Hospital Corps, was tireless in his inspection of our camps, kitchens, and latrines.

My notion of the importance of the subject of coast defense leads me to make a further and somewhat extended statement.

Under our system of government the artillery corps of the Regular Army in time of peace will probably never be one-fifth as large as the strength required to man and operate the coast defenses of the country. When necessary details and the number of men who are liable to become sick and disabled are accounted for the number of officers and men assigned to coast artillery in time of war must be very large. The care and operation of seacoast batteries require skilled and technically educated men. In the hands of the unskilled and uneducated men the coast defenses are worthless and perhaps a menace rather than a means of defense. In modern times the fire from ships of war is very accurate and extremely destructive and must be met by heavy fire under intelligent and skilled control.

The Atlantic seaboard States, especially in the north, probably have more mechanics and skilled men in proportion to the population than any other portion of the country. There the men are to be found to learn coast defenses because the work is very largely mechanical and the forts are easy of access. If the Government is not to have constantly under its control and on its payrolls a number of men sufficiently large to take charge of these coast defenses in time of war it must rely upon the militia of the States, and if the militiamen of the States are willing to give their time and energy to the study of the highly scientific and skillful problems of laying and firing these pieces and caring for them they certainly ought to be furnished with the means of studying and learning the difficult problems.

For six years I have had command of two companies of coast artillery. They have drilled in the armory at New London through the winter as infantry and in the summer of each year have spent from a week to twelve days in the forts. They have had practically no access to the range-finding implements or the guns except while at the forts. We have been

repeatedly invited by the commanding officers of the district to bring detachments of men to the forts for drill through the spring and fall, but the men composing the coast artillery are very largely mechanics and all of them dependent upon their trades and business for a living and it is impracticable to attempt to take detachments of coast artillery to the forts for drill. The only time these men can give to drill of this kind through the year, without pay, is in the evening, and that they are willing to do.

I believe it is found in the Regular Army that the only way that efficient service of large batteries can be had is by assigning companies to particular batteries and confining their regular drill to these batteries. If that is so in the Regular Army it must necessarily be doubly so in State militia.

Further than this, advance is constantly being made in the science of laying the large guns and the implements and methods are undergoing gradual changes.

My belief is if the Government expects the State militia to present and maintain anything like a respectable condition it must furnish them with the latest and most improved appliances for range finding and for learning the science and technique of coast artillery. The Connecticut companies ought to remain assigned to particular batteries and I recommend that the First Company Coast Artillery of Connecticut be assigned to the Tenth Battery and that they be furnished with two azimuth instruments and the Whistler-Hearn plotting board, the dial for the range and wind components, the range board, and the deflection board and that the Second Company be assigned to the mortars and that they have also the Whistler-Hearn plotting board for mortars and the set forward device. Both companies can use the same azimuth instruments. With these in the armory the men may receive instruction from officers of the New London artillery district, who are willing and anxious to instruct and assist the militia in every way.

In this way accuracy is secured and the precise terms used in the Regular Army are learned by the militia and become a part of their speech in operating the various appliances.

If this consideration is shown to the coast artillery militia it will attract a good class of men and the personnel of the

State militia in my opinion can be improved in this way. I do not believe that accuracy and efficiency can be had in any other way.

Further, I believe the mingling of the men in the Regular Army with the militia will be a benefit to the regular army men. When the regular army man visits the town or city nearest his post if he has friends and acquaintances in the vicinity he certainly will have a different feeling about his conduct and I believe the discipline of the Army will be improved by this contact.

When the war with Spain broke out the people of this country were brought face to face with facts and the warning of many of the wisest statesmen of the country which had remained unheeded became a distressing reality.

Since the Spanish war this Government has spent a great deal of money in coast defense. If a war should break out to-day our coast defense armament, if put to test, would be a source of disappointment from lack of a sufficient number of men qualified to operate it.

If coast defense is to be more than an empty threat men must be constantly educated to control these mighty engines.

I believe the suggestions I make have the merit of economy and efficiency.

[Capt. EDWIN E. LAMB, commanding Company A, First Infantry, Connecticut National Guard.]

Recommends that companies be furnished with drill books on coast artillery; same troops to go to camp at forts each year; that militia companies going into field be issued 1½ rations for first six days.

[Capt. EUGENE J. ASHTON, commanding Company L, First Infantry, Connecticut National Guard.]

Recommends this kind of encampment for national guard troops.

[Capt. FRANK B. GURLEY, adjutant Third Infantry, Connecticut National Guard.]

Regimental sergeant-major devoted a good deal of time with post sergeant-major for the purpose of learning how the work was conducted in the regular service. Believes men as a whole have derived benefit from this camp and have enjoyed every moment of the time.

[Capt. PERCY H. MORGAN, quartermaster Third Infantry, Connecticut National Guard.]

Arrived July 13 to look after camp equipage; found same had been transferred to camp except a few minor articles. Camp all laid out and all to be done was to establish lines and intervals for company and officers' tents from a blueprint furnished. Was on duty for the full twelve days as quartermaster. Tour has been highly instructive. Suggests in future that some quartermaster of the Army give the quartermasters and quartermaster-sergeants course of instruction in duties and that militia mustered into service with regular troops receive all issues and allowances of the Regulars from the quartermaster department, as is the case with the commissary department; that a detail of militia be ordered out in advance with the quartermaster to do the handling and guarding of the property until full force arrives.

[Capt. CHARLES A. THAYER, commissary Third Infantry, Connecticut National Guard.]

On his recommendation a cook from the regular garrison was detailed to spend one day with each company cook and many valuable suggestions gained thereby as to the economic handling and serving of the ration. Recommends that beef, potatoes, and coffee components be increased for the first two days because of abnormal appetites of men on first going into camp. Seventy-five cents commutation of rations not taken advantage of; reasons given that company commanders did not understand the order, due, probably to careless reading of same. Suggests therefore that hereafter travel ration with ground coffee be issued direct to company commanders.

[Capt. FREDERICK P. WOOD, paymaster Third Infantry, Connecticut National Guard.]

Pay rolls made out after much difficulty, because rolls were not explicit in information desired; also because of limited number furnished which did not allow for possible errors. Company commanders worrying more over pay rolls than the actual field service. Recommends sample roll be made out by the pay department showing in full the information desired, and clerks from this department be sent to inspect dif-

ferent company clerks as the quickest and surest way to make rolls up.

As the making up of pay rolls is such a simple clerical position when supplied with an unlimited number of rolls and proper instruction for same, believes the last of the above has done much to confuse the clerks in just how things ought to be done and has given them very little instruction of any kind.

The requirements of General Orders, No. 99, War Department, c. s., that the date of enlistment must be put in, with no column therefor and two columns for date of enrollment and date of discharge caused great confusion. A column should be put in for "date of enlistment" in addition to the other two.

[Capt. WILLIAM G. TARBOX, commanding Company C, Third Infantry, Connecticut National Guard.]

The evening lectures and the conversations that followed were very instructive, presented new ideas, and gave a better understanding of our coast defenses.

[Capt. EDWARD P. WEED, commanding Company D, Third Infantry, Connecticut National Guard.]

Considers that this encampment has been of more benefit to both officers and men than any camp he has ever attended. Regular Army officers have given information and instruction of great value.

[Capt. CHARLES L. WING, commanding Company F, Third Infantry, Connecticut National Guard.]

Most beneficial lesson has been along lines of camp cleanliness. In former years has been called upon for a maximum of work with minimum amount of instruction, reverse has been the case during this tour. Enlisted men have received the correct idea of military courtesy as well as a better idea of their duties in the field. This battalion would be greatly benefited by being sent to this post as a battalion for a number of years.

[Capt. WILLIAM A. PRATT, commanding Company H, Third Infantry, Connecticut National Guard.]

Is of the opinion that officers and men have gained more knowledge of warfare during this tour of duty than would be possible in State camp at Niantic in a tour of much greater duration.

[Capt. LOUIS J. HERMANN, commanding Company K, Third Infantry, Connecticut National Guard.]

Thinks that if men of Connecticut National Guard understood for certain that they would be assigned to certain fortifications for regular duty and a yearly 12-day camp thereat would improve class of recruits.

[Capt. SEMAN M. MEAD, commanding Company L, Third Infantry, Connecticut National Guard.]

Took part in all problems and found them very instructive and badly needed and would not have had them in State camp. Thanks due to Regular Army officers for this, who took every opportunity to teach and instruct us and the non-commissioned officers and privates. This tour of duty has been of great benefit and hopes all future encampments will be of the same kind.

[Capt. J. A. HAGBERG, Third Infantry, Connecticut National Guard.]

The encampment was of benefit to the men by being in contact with the Regulars in military etiquette and uniformity of dress.

[Capt. ARTHUR P. WOODWARD, Third Infantry, Connecticut National Guard.]

I wish to express my gratitude for the courtesy received from the officers of the post and those that were detailed there during the maneuvers. The informal talks given the evenings of the first week were very instructive and interesting, as they covered subjects that I was not familiar with. On the whole, I found the tour the most satisfactory one that I have attended, inasmuch as the situation was thoroughly explained and we knew what we were expected to do and how to do it.

[Capt. C. E. RYDER, Third Infantry, Connecticut National Guard.]

The officers and men of Company G have only the best of praise for the officers and men of the Forty-third Company, who were ever ready to show and explain to them anything that they wished to ask, and oftentimes as I passed through the company street the men would be gathered around some of the Regulars asking them questions pertaining to their several duties.

The ten days at the fort has been of great benefit to each member of my company and if it is repeated next year it will be time well spent and will be of great advantage to us, but if we are to go back to infantry duty again it will be time and study lost.

If we could be assigned to some battery permanently and know that it was to be our assignment in case of war or one similar to it the officers and noncommissioned officers of my company could learn a great deal through correspondence and the captain of the battery could make an inspection at least once during the drill season and be able to give us a little benefit of his experience.

[Capt. DAVID CONNER, Third Infantry, Connecticut National Guard.]

While it was nothing new to me and no more than I expected, having been with the Army while in the U. S. Volunteers, yet it was very noticeable how the officers and men of the Army tried to make this tour of duty pleasant and interesting. They did all that was possible.

Having had the experience of breaking in two companies of volunteers and taking part in 25 encampments with the Connecticut National Guard I find that in taking men from their homes and putting them into camps it creates enormous appetites for the first ten days, and while the ration is more than enough for them after that time I would respectfully suggest that for the first ten days in camp there be made a slight increase in the meat and vegetable ration.

On the evenings of July 17, 18, 19, and 20 the officers of the Coast Artillery Corps lectured on subjects pertaining to the coast defense, which lectures were not only interesting but very instructive.

[Capt. ERNEST ROGERS, commanding Second Company, Coast Artillery, Connecticut National Guard.]

All officers and noncommissioned officers present during the entire encampment and hopes to see a maximum company present next year and man a battery of four mortars. Mentions uniform and exceptional courtesy extended by all officers of the post.

[Comments of District Commander Colonel PARKHURST on Second Company, Coast Artillery, Connecticut National Guard.]

Captain Rogers's company did excellent service, officers and men all showed zeal, intelligence, and great interest; would be glad to have this company here every year for service.

[Capt. EARL H. HOTCHKISS, commanding Signal Corps, Connecticut National Guard.]

The entire tour of duty of the corps has been characterized by hard work, faithfully and cheerfully performed. The service and experience gained was of the greatest practical importance to the corps, and as the men were with but few exceptions electrical men the work was of more than ordinary interest and all performed the various duties with enthusiasm and as a corps we are anxious and hope for similar duty each year.

In closing my report I wish to express my appreciation of the courtesy shown to myself and command by yourself, your officers, and men and that the pleasant recollection of this tour of duty will always remain.

[Capt. JOHN H. EVANS, Hospital Corps, Connecticut National Guard.]

If each organization had a copy of the pay rolls, properly filled in, for a standard to work by much delay and many errors would be avoided and the pay rolls would appear more soldierly when they reach headquarters.

I wish to signify my appreciation of the courtesy and instruction extended by the Regular Army officers we were in contact with—it could not be exceeded.

[First. Lieut. OTTO MANTEL, Company A, First Infantry, Connecticut National Guard.]

Recommends supply of artillery books and pamphlets and a plotting board. Also that same company be sent to Fort Mansfield for next annual encampment.

[First Lieut. FRED. T. GREENE, Company L, First Infantry, Connecticut National Guard.]

Recommends that company will be ordered again for same duty.

[First Lieut. W. H. VAN STRANDER, assistant surgeon, Connecticut National Guard.]

Health of command excellent; no sickness; only one admission to hospital for minor injury to a finger; ideal location for camp; soil, fine white sand; no flies; comments on character of latrine troughs as not being deep enough. Recommends that roofs of lavatories (latrines probably meant) and kitchens be arranged to lift to admit sun.

[First Lieut. WILLIAM H. MARIGOLD, Jr., adjutant First Battalion, Third Infantry, Connecticut National Guard.]

Duty interesting and well done.

Officers and men of Regulars pleasant and kind in every way and gave benefit of their knowledge freely; duty was very profitable to all and hopes it may be repeated.

[First Lieut. FREDERIC G. C. SMITH, Third Infantry, Connecticut National Guard, adjutant Second Battalion.]

Speaks in praise of the officers, U. S. Army, with militia during the camp—have been most courteous and willing to give instruction at all times—and is grateful for varied and extensive information received. Is in favor of continued camps of this nature.

[First Lieut. CLIFFORD WILSON, commanding Company B, Third Infantry, Connecticut National Guard.]

Expresses idea that camp was best he had ever had; men enjoyed work, showed great interest and desire to obtain all knowledge possible.

[First Lieut. H. T. PROWITT, Company D, Third Infantry, Connecticut National Guard.]

With company and took part in all problems and exercises. Conversation with and instruction from Regular Army officers of much benefit.

[First Lieut. HOWARD N. GODFREY, Company F, Third Infantry, Connecticut National Guard.]

Took part in each of the problems. Tour of duty the most instructive for both officers and men in my experience, due to great interest shown by army officers detailed during the tour who have gone out of their way to assist and instruct both officers and men of the militia. Men have taken a greater interest in this tour of duty than ever before. Would be of benefit to be sent here again in preference to Niantic.

[First Lieut. ALBERT GARRINGER, Company II, Third Infantry, Connecticut National Guard.]

Most striking thing in entire tour was the royal good fellowship extended to us by the Regulars; there was an utter absence of that superior air the professional usually has for the amateur.

[First Lieut. STANLEY J. HEDINA, Company K, Third Infantry, Connecticut National Guard.]

Found lectures very instructive and men took hold with a will; best camp ever attended.

[First Lieut. A. STANLEY TODD, Company L, Third Infantry, Connecticut National Guard.]

Can not say too much in praise of the very able instruction given and the courteous way we were treated by the officers connected with the post and those detailed for the exercises. Has gained more actual knowledge at this camp in the art of war than has in three previous camps and strongly recommends this place as an ideal place for future instruction.

[First Lieut. W. W. PHILBRICK, Third Infantry, Connecticut National Guard.]

I wish to state that this tour of duty was a very instructive one, owing to the fact that the officers and men of the Army did everything to make it so.

In conclusion, I will say that in my opinion where the National Guard and Army take part in joint exercises it is a great benefit to the National Guard.

[First Lieut. F. J. ADAMS, assistant surgeon Third Infantry, Connecticut National Guard.]

Incinerators have his hearty approval. Suggests enlargement to 6 seats.

Tour of duty greatly enjoyed and hopes it may be repeated next year.

[First Lieut. W. B. PAYNE, First Company, Coast Artillery, Connecticut National Guard.]

I have the honor to report observations taken by me while acting in the capacity of Range Officer at battle command station for Battery Barlow, Fort H. G. Wright, N. Y., during the encampment and maneuvers of July 15-26 in which

the First Company, Coast Artillery, participated, acting as reserves to the Second Company, Coast Artillery Corps, U. S. Army.

From the start it became apparent that the range section from the first company would have difficulty in mastering the operations necessary to orienting and handling the instruments and plotting boards, etc., but under the guidance and instruction received from the regular army section permanently stationed at the station they managed to learn the simple use of the instruments without knowing how and why the operations were deduced.

The coast artillery of the State of Connecticut should be furnished with some equipment so that they may, during the dull season, acquaint themselves to such an extent that they would be able to man the stations with far less instruction than is now so apparent.

During the encampment the officers of the First Company received some very fine instruction in the form of lectures.

[First Lieut. ERASTUS J. MCGLOFLIN, Second Company, Coast Artillery, Connecticut National Guard.]

This being my eleventh encampment, six of them with the coast artillery, I have no hesitation in saying that it was one of the most satisfactory and pleasant to me as well as to the enlisted men.

As emplacement officer at the mortar battery I can not speak too highly of the thorough training which we received there.

I also beg leave to submit the following suggestions for your consideration:

1. That the armory at New London be supplied with complete range-finding instruments.

2. That the encampments of the coast artillery, Connecticut National Guard, be for a period of not less than eight days, or if for six that a working party be sent in advance to prepare camp.

3. That evening schools be held at Fort Trumbull and our men be given an opportunity to study for and qualify as first and second class gunners. Those qualifying to be given increased pay and the regulation badge or decoration.

4. That the men be paid off on the last day in camp or on arrival at home, as many of our members are working men with families and waiting for their pay is a hardship to them.

[First Lieut. EDMUND B. REED, Coast Artillery, Connecticut National Guard.]

The officers at the post and those detailed for the encampment we found very courteous and instructive and willing at any time to show us and help us in things we might ask; we also found in talking with the enlisted men that they were treated by the Regulars in the same way; we also met the officers stationed at the post in public life and found them just the same and willing to aid us as though we were at the post.

I found in talking with the men that a ten or twelve days' camp is satisfactory, also they were more than pleased with the camp this year on account of no guard duty to perform. Our companies have been so small that in the five previous camps of the Coast Artillery Corps we had to use the men both for guard and the gun details and it meant that as soon as the practice was over back on guard they went; the consequences were they came back from camp dissatisfied and the next camp did not see them; they were out of town and they did not encourage men to join. I think after the camp we will see an increase, as the men were pleased with this year's camp.

I would recommend that if we are to act as reserves, unless we have more men than is necessary to form the different detachments, we be excused from guard duties.

I would suggest that some arrangement be made so that if the chief sanitary officer orders the militia companies to furnish articles as soap, scrub brushes, brooms, etc., they can be purchased at the post. This order was given to the commander of the First Company, but they could not be purchased at the post. Another suggestion is that an order could be published and sent to the companies before leaving home stations, for the guidance of the militia, stating what articles are necessary for them to bring to camp for sanitary purposes.

I would also suggest that if the companies could be supplied with azimuth instruments, plotting board, dial for wind and range, deflection board, and set forward device it would

bring us one more point nearer to the Regulars in our work. We lose a great deal of time learning how to read and work these instruments the first days of camp that might be saved if we could have instructions in the armory to use at our weekly drill. With us now we drill all winter as infantry and at camp act as artillery.

[First Lieut. S. P. BAKER, Signal Corps, Connecticut National Guard.]

I wish to record my approval of the work and benefits afforded from the practice here during the past twelve days and would recommend the continuation of such times as is possible.

[Second Lieut. U. A. RIVARD, Company L, First Infantry Connecticut National Guard.]

Comments favorably on sanitation of the camp generally.

[Second Lieut. HOWARD H. MOSSMAN, Company D, Third Infantry Connecticut National Guard.]

Information gained by the officers of the National Guard has been invaluable; the officers of the regular service did everything to help and instruct us in our work.

[Second Lieut. ALBERT R. SCOFIELD, Company F, Third Infantry Connecticut National Guard.]

Work in field most valuable to all and ranks ahead of any in which he has ever participated, result of coming in close contact with Regular Army officers to point out and explain defects in field work. Conduct of men, good; sanitation, perfect.

[Second Lieut. D. D. SHEA, Jr., Company H, Third Infantry Connecticut National Guard.]

Thinks militia would be benefited if it went into camp every year with regulars; all militia officers should be instructed in road sketching.

[Second Lieut. FRANK W. STEVENS, Company K, Third Infantry Connecticut National Guard.]

Work at guns (Battery Bardford) was interesting and instructive; evening lectures also. Courtesy and willingness to answer questions all greatly appreciated.

[Second Lieut. JOHN J. HAFF, Company L, Third Infantry Connecticut National Guard.]

Sanitary arrangements excellent. Gained much experience in defense, attacking, and patrolling that could not be obtained at State camp. Information gained by contact with Regular Army officers will be of great benefit.

[Second Lieut. ELBERT L. DARBIE, Third Infantry, Connecticut National Guard.]

On the evenings of July 17, 18, 19, and 20 the officers attended lectures on various subjects relating to the situation, the lectures being followed by informal talks on the subject. These meetings were very instructive and I think that every officer of the National Guard learned more about coast defense than he ever expected to know.

[Second Lieut. J. L. ORN, Connecticut National Guard.]

The sanitary conditions at the fort are worthy of mention. The post surgeon and assistant surgeon were untiring in their work, making daily inspections about 8 o'clock a. m. and, I found, keeping close touch all the time with the conditions about the camps. Latrines, kitchens, and mess tables were scrubbed daily.

In connection with the sanitation, I might add the post surgeon ordered scrub brushes, lye, soap, and a few other essentials purchased to be used in the carrying out of his orders, but found it impossible to get these articles at the post either through issue or purchase. It would seem that some arrangements should be made whereby the militia could have such articles necessary for the sanitation of their camps, when such articles are ordered by the post surgeon, issued to them by the Government. Otherwise it would appear more or less impossible to comply with their orders.

During this tour of duty the health of the men could not have been better and every man came away better than he went and thoroughly satisfied with the camp.

The matter of poor roads and the lack of facilities for the proper handling of baggage struck me as being matters worthy of some consideration. If it is the intent of the Government to establish permanent camps for the State troops something should be done to improve the roads.

If it is the intent of the Government that we should man these forts in event of war we should have more practical experience than we get while at the forts for a week or two during the summer.

What we need is to have such equipment installed at our armory as would enable us to learn the science of coast artillery.

The drill on the guns proper, while an important feature, can be learned at short notice when at camp, but what the men want is an opportunity to study deeper into the scientific principles governing the art of aiming and laying the pieces.

[Second Lieut. EDWIN CRUISE, First Company, Coast Artillery, Connecticut National Guard.]

A manning table was made out day of arrival, July 15, 1907, and active work commenced Tuesday, July 16, with morning and afternoon drills, the men being quickly broke in in shorp snappy work.

The First Company, Coast Artillery Corps, Connecticut National Guard, are without coast artillery drill manuals, both gun and position finding, not to speak of instruments such as used in range-finding stations, and I respectfully urge the obvious necessity of supplying in some way the coast artillery of Connecticut with the proper appliances, so that effective and accurate work could be done during the limited time the State troops have the opportunity to do work on guns and range-finding stations.

So far as can be learned the men were satisfied with conditions at this station, a matter peculiarly interesting to me as a State officer, owing to the personal burden a State officer carries in the matter of recruiting.

[Second Lieut. ANSON A. BROWNELL, Second Company, Coast Artillery, Connecticut National Guard.]

Was his sixth encampment with the coast artillery, Connecticut National Guard, and says it was one of the most interesting and instructive that he has ever attended. Speaks with pleasure of the relations existing and the thorough and competent instruction received. Men made remarkable progress, as record at target practice will show.

[Contract Surg. MARION F. MARVIN, surgeon.]

Health of command perfect; sanitation as near perfect as well could be except substitution of McCall incinerators for trough latrines.

STATE OF NEW YORK.

Eastern Artillery District of New York.

[Date of exercises: June 8 to 15.]

COMMENTS OF REGULAR OFFICERS.

[Col. G. N. WHISTLER, Coast Artillery Corps, commanding eastern artillery district of New York, Fort Totten, New York.]

The National Guard troops arrived promptly on time and established their several camps in a soldierly manner. Their discipline during the entire time was excellent. After the first day their attention to the requirements of military courtesy and their soldierly bearing improved with astounding rapidity.

Their interest and enthusiasm for the work assigned to them and the rapidity with which they learned the elements of the drill was very marked and demonstrated beyond question that with proper armory instruction and annual maneuvers these troops will rapidly become valuable adjuncts to the coast artillery. The plan to increase coast artillery during time of war by such troops would unquestionably produce a far more efficient force than any system of enlistment of green men.

I would recommend that organizations that are willing to take up this service be permanently assigned to a given artillery district and be considered as a part of the garrison of the same for war; that it be made the duty of the artillery district commander to detail officers to serve as instructors in armories of such commands, and that provision be made whereby the field, staff, and other officers of the command may pass an examination before a board of officers of the artillery district to which they belong and qualify for positions as artillery fire commanders, communication

and searchlight officers. This will, I think, satisfy these officers who now consider that they have no place in the work.

Based upon my own observations as well as the report of the commanding officer of Fort Schuyler, I desire to express myself in the highest terms of the services of the two companies of the Forty-seventh Regiment National Guard New York as supports and of the three companies of the Thirteenth Regiment as artillery reserves. The manner in which the Thirteenth Regiment handled the guns and the position-finder stations demonstrated beyond question the value of national-guard troops as auxiliaries for coast defense after proper training.

Every effort has been made to obtain the reports of the commanding officer of the battalion of the Forty-seventh Infantry, National Guard New York, and his subordinates. They have not been received.

[Maj. A. C. BLUNT, Coast Artillery Corps.]

Major Ashley was detailed as assistant fire commander by the district commander. He used his staff officers as communication and searchlight officers and had a complete manning detail for the fire control station. His detail worked as second relief under his orders exactly as the regular detail under mine—in fact after the preliminary drills I left him entirely alone in the management of the fire command, taking watch on and watch off.

At the inspections of the chief of artillery and the adjutant-general, State of New York, all batteries at the post and all stations were manned by the National Guard; the district commander knows the excellent showing made at these inspections; the interest and desire to improve were manifest at all times, and though I was familiar with the high standard of the officers and men of the regiment by previous acquaintance I was surprised at the excellence of their work.

The work of the combined regular and national guard garrison was most satisfactory; the best of good feeling existed between officers and men of the two and it was a benefit to all to serve together. I believe that the same detachments should be assigned here on any repetition of these

exercises; they would soon take a personal interest in the post, which would be of advantage to the regular garrison; and if a permanent assignment for coast defense followed, would be so familiar with duties and environments that their services would be immediately useful on call.

[Maj. JOHN K. CREE, Coast Artillery Corps.]

I consider them (exercises) to have been of advantage to myself and all who were concerned in them, since the conditions approached those of actual war, and I believe almost all officers are in need of such experiences.

Permanent parapets for infantry and emplacements for field guns should be constructed at all coast artillery forts at points along the shore line favorable for repelling landing parties and searchlights should be provided for this important purpose.

[Maj. GEO. F. BARNEY, Coast Artillery Corps.]

They (militia) took great interest in the work and learned much. They would form a valuable reserve in time of war and should be used as such in preference to filling up the regular companies with untrained recruits. Both the militia reserve and support companies were very well behaved during the exercises.

[Capt. EDWIN LONDON, Coast Artillery Corps.]

If the militia is to seriously take up the work of qualifying as coast artillery reserves and if they aim to include in their preparation fitness to operate power plants and maintain communications, the individuals assigned to the latter work should be required to become thoroughly acquainted with the electrical and power installation of the fort to which assigned before turning out for active work, and this preparation should to some extent at least be under the personal direction of the regular officer who is artillery engineer in this particular fort for the time being.

[Capt. H. H. SHEEN, Coast Artillery Corps, communication officer, Fort Totten, N. Y.]

The battle commander's station should be provided with the following additional equipment: 1 bookcase, with lock; 1 cupboard, with lock; chart racks; 1 powerful telescope,

with sling and bracket supports; 1 pair of the best procurable night glasses; signal staff and set of signal flags for signaling vessels and also for use if other communications go out; station should be supplied with canvas hammocks and hooks for use of detail when off duty.

INSTRUCTORS OF SUPPORTS.

[Capt. F. W. LEWIS, Twenty-ninth Infantry, U. S. Army.]

I found that the national guardsmen entered upon the performance of these duties with much interest and energy and performed them well. This interest was shown by the fact that the time allowed for the morning drills was often extended by request so that the full exercise could be carried out.

In my opinion all concerned in the maneuvers of the week received considerable benefit. The officers of the National Guard stated to me that the benefit to them had been great.

[Capt. JOSEPH S. HERRON, Second Cavalry, U. S. Army.]

I found the guardsmen prejudiced against regular officers (as they afterwards confided to me), but I left them enthusiastic and grateful for the "kindness and instruction" given them by me and the officer associated with me, Captain Ansell.

I believe that similar maneuvers should be conducted as often as possible. The militiamen with whom I was on duty wish to return to Fort Schuyler and prefer it to Peekskill. I think the plan this year of attaching one regular officer to each company is most effective, for the reason that he concentrates his entire time and efforts on a small number and becomes one of them and imparts valuable information with every conversation over cigars in the evenings as well as at formations of troops.

I am convinced that the officers selected for this duty should be men of great tact, as one act of rudeness can undo the good work of hundreds of careful officers.

I recommend as a result of my experience on this duty the establishment of night schools for the garrison school course of instruction for militia officers in cities, as the present garrison schools are not available to the average militia

officer who has business or profession to claim his daytime hours and can not usually go far from town in order to attend the garrison school on an army post. The militia officers informed me that there would be a large attendance at such a school should one be established in New York and Brooklyn.

I commend the conduct, discipline, zeal, and efficiency of Major Jackson's command most highly.

[Capt. G. T. ANSELL, Eighth Infantry, U. S. Army.]

All the duties of both officers and men of this command were, it seemed to me, performed in a most commendable manner.

The relation existing between the regular officers and the militia at Fort Schuyler was a pleasant, interesting, and instructive one, offering unentrammed facilities for instruction, even to pointing out defects and criticism, in which we endeavored of course to be fair, careful, conservative. I found the officers thoroughly receptive and appreciative of our efforts in their behalf.

I was impressed with the quiet, orderly behavior of the enlisted men, and their energy during these maneuvers, as well as with the zeal of most of the officers. I was likewise impressed with the dignified manner of the battalion commander in handling officers and men.

[Capt. C. A. TROTT, Fifth Infantry, U. S. Army.]

The method of posting all umpires on shore at the points to be attacked as practiced on June 14 is vastly superior to that practiced the night before when two umpires accompanied the attack, though the latter method would probably be satisfactory if there were sufficient umpires to cover all points of the defense.

It is essential that the plans of both sides, particularly the attack, be furnished umpires before the action. This was not done on the 13th and resulted in umpires not being at the right spot at the right time.

So far as the infantry instruction is concerned, it could be vastly increased in scope and value if it were possible to operate on terrain off the roads of the reservation, so that

practical problems could be given on varied ground. The military reservation of Fort Totten is inadequate for this purpose.

COMMENTS OF MILITIA OFFICERS.

[Maj. E. F. AUSTEN, First Brigade, National Guard of New York.]

During the attacks I was with the battle commander in his station and received instruction from him in the duties of assistant battle commander.

I would further say that it is my belief that this tour of duty was of great benefit to this command in various ways.

The excellent example set by the regular soldiers in discipline and courtesy was of profit to the men of this command and I believe will be lasting in its effect.

The work was of an interesting nature and every opportunity was afforded by the district commander for instruction, which was eagerly embraced.

I would strongly recommend that this command be given an opportunity to take part in joint exercises each year, that the whole command be assigned as artillery reserves, and that in future the men be provided with leather gloves for use in drill at the guns.

[Capt. GEO. HIECKE, commanding Company F, Eighth Infantry, National Guard of New York.]

I would suggest that companies be assigned to the same batteries and that some preliminary instruction be given to officers.

[EBEN E. ACKER, acting adjutant, Eighth Battalion, National Guard of New York.]

The opportunities afforded to ascertain the opinion of both officers and men of this command were unlimited and I took advantage of as many as possible, and with my own impressions combined with theirs I am enabled to reach a conclusion that no amount of argument to the contrary could change.

About twenty-four years have elapsed since I first joined this command, during which time I have been out of the service about two years; there remains to my credit therefore about twenty-two years of service, which has been spent

as an enlisted man for over fourteen years and as an officer the balance of the time. During the period above mentioned this command has participated in eleven tours of camp duty (one of which I missed) and in addition thereto I have twice been detailed for a special tour of duty at the State camp. I therefore feel that I am fairly well qualified to make comparisons between past experience and the tour of duty just concluded. It is no reflection on the State camp to say that it has not done nor can it do for this command anywhere near that which the tour of duty at Fort Totten has done. The State camp presents great opportunities which are taken advantage of by the organizations, but the character of the service required of this command at Fort Totten not only embraced all of the advantages to be obtained at the State camp but it also offered opportunities that the State camp does not include in its system of camp duty.

At no time, not even during the Spanish-American war when this organization was in the field for a period of six months, has there been such a demonstration of interest, of enthusiasm, eagerness, willingness, and a desire to do all and more than was required of them on the part of the men, and in my opinion this command has reaped untold benefit from its tour of duty, the influence of which will last for months, and I would like to see it detailed each year to the same place and for the same purpose as the tour just completed.

[First Lieut. PAUL LOESER, Eighth Battalion, National Guard of New York.]

In regard to the advisability and usefulness of the tour of duty, I beg permission to state that in my opinion the same was of great interest and of considerable good to this command. The morale and discipline of the men were excellent. They were thoroughly interested in the work they were performing and, though worked hard all week, showed continued willingness to answer any call to duty.

I therefore respectfully suggest that this company be assigned to one of the four batteries at Fort Totten not as yet assigned and be given opportunity during the summer, or on its drill nights during the early fall, to report at its station and be instructed in the handling of such battery.

I also respectfully suggest that company commanders be instructed under the supervision of United States Army

officers to hold schools for noncommissioned officers in the afternoon, explaining to them intelligently the why and wherefore of the instructions which they carried out mechanically in the forenoon.

I also respectfully suggest that both officers and non-commissioned officers receive lectures on the effectiveness and utility of different kinds of fire, both artillery and infantry, and also on the defensive value of different sorts of cover when under various kinds of fire.

I suggest that the Eighth Infantry, National Guard of New York, be formed into a regiment of coast artillery and be permanently stationed as a reserve at Fort Totten, N. Y.

[First Lieut. FREDERIC N. WHITLEY, Thirteenth Regiment, Coast Artillery, National Guard of New York.]

The exercises were to my mind a success in every way and should be used as a model for future exercises. I would suggest, however, that these take place yearly instead of but once every second year as at present.

The plan of placing the militia, company for company, with the regulars has been productive of excellent results, in that it cultivated the spirit of emulation among the militiamen. The ambition of every man in my company seemed to be to not only do his work as well as the regular, but, if possible, to surpass him.

[Second Lieut. A. M. BREMER, Company F, Eighth Battalion, National Guard of New York.]

The majority of the men had never seen a mortar before and none had ever had instruction in handling the same, yet by attention to duty, willingness, and a keen desire to learn, perfected themselves in the work until permitted by the commander to fire blank charge.

The loadings with dummy projectiles of service weight and simulated firings in competition with regulars was effected in time as low as thirty-one seconds as against twenty-eight seconds. The time taken during the battle exercises when blank ammunition was used reached as much as 1 minute and 40 seconds due to unavoidable delays, the average time running between forty and eighty seconds, but difficult to maintain below sixty seconds, due in a measure to delay in the transmission of intelligence.

The work of tracking was, I believe, accomplished to the satisfaction of the officer in charge. While the careful and exacting work at the plotting board was fairly well understood by those assigned to the work, inexperience and shortness of time of course prevented shifting the men in their various positions, thus making the organization most useful under all circumstances.

Our men have endeavored to emulate the work of the Eighty-seventh Company, Coast Artillery Corps, and I feel that the disciplinary influence has been very beneficial, besides I have no knowledge of any clash or friction having occurred between either the officers or men of either branch of the service; on the contrary nothing but good fellowship prevailed.

The hearty response on the part of the men and the unanimity of opinion have caused me to urge that our organization be again made an artillery regiment of twelve companies of the infantry order.

Southern Artillery District of New York.

[Date of exercises: June 8 to 15.]

COMMENTS OF REGULAR OFFICERS.

[Col. HENRY L. HARRIS, Coast Artillery Corps, commanding southern artillery district of New York, Fort Hamilton, N. Y.]

The work was made progressive, interest was sustained throughout the week, and results were very satisfactory.

I desire to commend to the attention of higher authority the admirable manner in which the action of the "fleet" was initiated and carried out by this officer. His comprehension of the situation and methods of developing plans of attack left nothing to be desired.

The communications when manned by instructed details worked satisfactorily.

There is general complaint on the means of communication between fire and battery commanders and between the latter and his guns. The present arrangement is unsatisfactory and steps should be taken to remove the difficulties.

The good quality of the camp conveniences, cook sheds, mess sheds, lavatories, lights, incinerators, and water supply

and the dispatch with which they were constructed in the short time allowed and under adverse circumstances is highly creditable to the quartermaster's department.

OBSERVATION AND COMMENT.

1. The exercises were highly successful. This is particularly gratifying when the rather adverse conditions attending the furnishing of the State quota for this district is considered.

This result was brought about:

(a) By the method of camping each company of reserves with a regular company and furnishing a regular officer with each company of supports.

The regular officers and men made an earnest effort to carry out the ideas of the War Department in this experiment.

(b) By the conveniences furnished in camp.

The militia were favorably impressed to start with and appreciated the fact that the conditions of the National Guard were recognized without dubbing them "feather bed soldiers."

Results show that no effort should be spared to provide every comfort possible for men who come into camp once in two years.

2. There was a general desire on the part of State troops to have the regiment more fully recognized.

This could very easily be done in case of supports. At same time it shows that the guard organizations are very dependent on the State club idea and points unquestionably to organization of United States artillery reserves separate from the mobile forces of the State.

[Comments of the department commander, Department of the East, on the joint coast defense exercises.]

[Third indorsement.]

HEADQUARTERS DEPARTMENT OF THE EAST,
Governor's Island, New York, October 17, 1907.

Respectfully forwarded to the Adjutant-General of the Army.

These exercises have been most successful, the militia serving as a reserve showing a keen interest for the most part

in artillery work and those serving as supports evincing high appreciation of the excellent efforts of the infantry and cavalry officers to instruct them in the methods of modern field service. In this connection Major Ellis's report is noteworthy in its suggestion for a Federal reserve.

F. D. GRANT,
Major-General, U. S. Army, Commanding.

[Capt. G. T. PATTERSON, Coast Artillery Corps, commanding U. S. Army torpedo planter *Major Samuel Ringgold*, in charge of attack.]

I have the honor to submit the following report of the operations of the vessels forming the attacking fleet under my command during the maneuvers of June 13 and 14, 1907:

In order to simulate as closely as possible actual conditions the torpedo planters *Major Samuel Ringgold* and *Colonel George Armistead* were designated as representing battleship squadrons, the district boats *Captain Rowell* and *Captain Morrison* representing destroyer flotillas, and the launch *Watson* a torpedo boat flotilla. Two 6-pounder Driggs-Seabury guns were mounted on each of the torpedo planters and one on each of the district boats. Blank ammunition was secured at Fort Hancock and the empty cases reloaded between phases. Two Very pistols with cartridges were furnished for night signaling, also some day smoke rockets and some night sequence rockets.

With the cooperation and assistance of the district commander and Capt. F. K. Fergusson, Coast Artillery Corps, commanding U. S. A. torpedo planter *Colonel George Armistead*, a plan of operations was drawn up for each phase—two day and two night phases. Memoranda which give an outline of operations planned, with details of same, are inclosed herewith and made a part of this report. As soon as all points could be worked out and decided upon orders were drawn up and issued to the fleet covering each phase, copies of which are inclosed herewith.

DAY PHASE, JUNE 13, 1907.

This attack, a reconnaissance in force to develop the fire of the batteries, was carried out practically as planned in the memorandum and orders. The fleet left Fort Hancock at 2.30 p. m. and moved up the main ship channel, the *Ringgold*

leading. At 3.03 p. m. the fleet was fired upon by the mortar battery at Fort Hamilton at a range of about 11,000 yards. At 3.14 p. m. the 12-inch batteries at Fort Wadsworth opened fire, range 8,000 yards. At 3.15 p. m., being abreast of No. 9½ bell buoy, the *Ringgold*, followed by the other ships, swung off to starboard, running in above Ambrose Channel describing the first loop of a figure "eight" and keeping about 6,000 yards away from forts. The *Ringgold* fired on Fort Wadsworth, firing alternately from port and starboard batteries. During the second round, at 3.47 p. m. when nearest Nortons Point, the destroyers were detached to make a dash closer in and develop position of rapid-fire batteries. During the dash both destroyers continued to fire on the rapid-fire shore batteries, which returned the fire. The position of all batteries was clearly outlined, especially at Fort Wadsworth. The firing was general from batteries on shore from 3.25 to 3.57 p. m., at which time the battle ship squadrons withdrew from the field of fire and were rejoined by the destroyers. The fleet then proceeded to Fort Hancock.

Comment.—As a reconnaissance, the movement was highly successful. The positions of all gun batteries on shore were clearly defined, as well as that of some of the ranges used. It was necessary to go at least that close in to get room to maneuver properly. The signals between ships worked well and all of them preserved their distances beautifully.

NIGHT PHASE, JUNE 13, 1907.

This movement consisted of a distant bombardment by battle ships covering landing parties below Fort Hamilton and South Beach, followed by an advance and run past if landings were successful.

The movement was carried out practically as planned except that the landing below South Beach, having been successfully made, was abandoned by Lieutenant Tompkins owing to his mistaking some fireworks in Brooklyn for the recall signal. He afterwards went back and landed, but alarmed a sentry. The landing and diversion at Gravesend Bay under Lieutenant Jordan were carried out successfully and an outpost captured. The battle ships maneuvered at long range and were apparently picked up at 7,000 yards range and several shots fired from shore. The ships started

firing at 9.15 p. m., but soon ceased as operations seemed to be directed against the destroyer flotilla (represented by the *Rowell*) which had cut loose from the other destroyer at Nortons Point and was making a dash for the Narrows. As all searchlights seemed to be directed on this ship the battle ships were in darkness and took advantage of this to run up the west bank to about 4,000 yards from Fort Wadsworth and lay to until 9.50 p. m., when both commenced firing on the forts and made a dash up the Narrows followed by the destroyer flotilla.

Comment.—There was not enough firing done at battle ships to have affected them at all until within 4,000 yards and it is not believed that either battle ship squadron was actually picked up so as to be plotted and tracked until 9.50 p. m. It seemed a mistake to put so many lights on the destroyer. The 60-inch light at Fort Wadsworth for over 20 minutes was directed toward Nortons Point as if expecting main attack from that direction, leaving all the channel to westward of beam in darkness. The diversion to screen landing party in Gravesend Bay was successful and the party landed in darkness. It would take a heavy line of shore pickets to prevent small landing parties in this bay or below South Beach under similar conditions. The importance of thoroughly comprehending signals was shown by experience of South Beach landing party and the possibilities of strange coincidences in colors of lights, etc. The conditions were favorable for the operations, as there was a drizzling rain falling and the searchlights did not seem to possess great penetration. I think it is fair to assume that barring mines at least half the battle ships would have been successful in running by the forts.

DAY PHASE, JUNE 14, 1907.

The weather was extremely favorable for this attempt as there was quite a thick fog, but not bad enough to prevent navigation.

The movement was carried out as planned, the weather assisting greatly. The movement on Coney Island was successful, the weather being almost too favorable to allow the possibilities of an attack at this point to be shown in its true

light. The destroyer flotillas left Fort Hancock at 7.30 a. m. The same can be said of the landing on Staten Island under Lieutenant Tompkins. The battle ships left Fort Hancock at 9 a. m., and proceeded without being seen to a point abreast of engineer wharf at Fort Wadsworth without being fired upon. It is estimated that neither ship was under fire from heavy guns for more than two minutes, as they were going full speed and had a flood tide.

Comment.—But little comment is needed here, as the facts are eloquent. Without good mine fields and patrol boats to watch them and protect them from interference the shore defenses are practically helpless under similar conditions. It would also take the closest kind of patrol work to prevent large landing parties from getting ashore unobserved.

NIGHT PHASE, JUNE 14, 1907.

This attack consisted in a demonstration by one destroyer flotilla at Fort Wadsworth, proceeding by way of South Beach Channel, feinting a landing and drawing the fire of the rapid-fire batteries so as to thoroughly arouse the infantry supports in the vicinity of South Beach. The other destroyer flotilla was to run by the forts under cover of the rain and fog, effect landings above Fort Wadsworth and Fort Hamilton, destroy the power plant at Wadsworth and flank the 36-inch light at Hamilton, after which the battle ships could run by in safety.

The movement in all its essentials was a success. The destroyer flotilla *Rowell* under command of Capt. F. K. Fergusson, Coast Artillery Corps, left Fort Hancock at 8.45 p. m. and proceeding by way of South Beach channel made a very successful demonstration against Fort Wadsworth from a totally unexpected quarter. The weather was very thick and as Captain Fergusson practically took charge of the *Rowell* and directed her movements by bearings on the searchlights he is entitled to great credit for the success of this demonstration. This demonstration made at 10.30 p. m. drew the attention of the infantry supports. The battle ships left Fort Hancock at 9.10 p. m. and proceeded up the main channel. Between 10 and 10.30 p. m. they maneuvered at ranges from 7,000 yards to 5,000 yards. They were apparently picked up at times when within the latter range, but

the beams were not kept on them long and the firing seemed desultory. The ships returned the firing at intervals. From about 10.30 to 10.45 p. m. all the attention of the shore defenses seemed to be concentrated on the *Rowell* and on the channel just below the narrows. The battle ships had moved over to the west bank in the darkness and steamed very slowly up the channel, awaiting the signals from the landing parties. At 10.45 p. m. a green star appeared above Fort Hamilton, the signal for a successful landing and attempt on the 36-inch light. The battle ships had approached within 3,000 yards and were still outside the searchlight beam and were not being fired upon. The powder smoke from the shore batteries and from the destroyers, added to the fog, seemed to screen them. About this time it had cleared considerably and it did not seem probable that the battle ships could remain longer concealed. The signal from Fort Wadsworth was to have been given at 10.45 p. m., but did not appear. About 10.48 the leading ship was abreast of Hoffman's Island and the 60-inch light at Wadsworth picked it up. Firing was commenced from the shore batteries and returned by the ships and it was decided to run by the forts. The ships accordingly steamed full speed ahead, firing from both batteries. At 10.50 p. m. the green star appeared above Fort Wadsworth, meaning that the attempt on the power plant had been successful. If the lights had all been extinguished now, as was contemplated, both ships could have run by unharmed. At 10.57 p. m. the run by had been accomplished and the recall signal given. About this time the lights at Fort Wadsworth were all extinguished. There had been some delay in honoring the district commander's order.

Comment.—The first part of the evening was very favorable for all the operations. There was a good deal of fog left and the rain continued until after 10 o'clock. This prevented the effective use of the searchlights and also rendered the work of the landing parties much simpler. The success of the attempt on the power plant shows the possibility of crippling a great fortification by a few determined men provided with high explosives. Probably nothing but regular land defenses, provided with searchlights, etc., would be effective in preventing such attacks.

GENERAL COMMENT.

The weather during the third and fourth phases, was especially favorable for the attacking fleet and it is believed that these conditions are precisely the ones under which real attacks would be made. Ships can be navigated when searchlights are not effective beyond 1,500 yards and having their position located the lights are great aids to navigation. Without mines and efficient patrol of the mine fields I consider an attack such as conducted under either the third or fourth phase would have a great chance of succeeding.

An attack on a clear day or night would have no chance of success unless a landing in force could be effected at some distance and an attack made on the land front. This only emphasizes the need for strong infantry supports.

INSTRUCTORS OF SUPPORTS.

[Capt. I. L. HUNT, Sixth Infantry, U. S. Army.]

THE WORK PERFORMED.

The regiment (Seventh Regiment, National Guard, New York) arrived about 10 a. m., June 8, and proceeded at once to the camp site assigned it. Camp equipage had preceded the regiment and company tents were promptly pitched. The remainder of the day was devoted to putting the camp in order, ditching tents, etc.

Sunday, June 9, the regular officers devoted to an inspection of the terrain in order to map out the succeeding work. In the afternoon the work for June 10 was outlined. A talk to the officers of half an hour on patrolling was given by Lieutenant Morris and another of about the same length on advance and rear guards by the undersigned. The same was repeated in the evening to the noncommissioned officers and such privates as cared to have the instruction in each company by the officer attached thereto.

Monday, June 10: The morning drill period was devoted to extended-order drill by companies for one hour, at the end of which exercises in patrolling were taken up. Orders for patrols were given in each company the day before and the men required to learn them, particularly the signals used.

(These orders were based upon the similar orders issued at Mount Gretna last summer and the Infantry Drill Regulations.) In the work of patrolling the companies were used in pairs, each company endeavoring to locate its opponent and report his strength. The work evinced great interest and as soon as the men understood what was expected was very satisfactorily performed. The afternoon drill period was occupied in advance and rear guard work, first by companies and then by battalions of three companies each. Squads had previously been sent out to fire upon the advance guards. In all such work the enemy should invariably be represented and given blank ammunition. The tendency is for men to get excited and out of hand as soon as firing begins. A half hour talk was given in the evening on outposts by Lieutenant Whitlock.

Tuesday, June 11: The first half of the morning drill period was devoted to extended-order drills by companies, as it was found that many of the noncommissioned officers lacked the confidence which comes from experience. Particular emphasis was laid on the question of taking cover. The latter part of the drill period was devoted to posting and relieving outposts. On account of the small size of the companies (the 6 companies had about 375 men out for drill) the Cossack post system was used. Particular stress was laid on the orders for sentinels, sending in information and transmission of verbal messages. The practice of sending verbal messages along the line of sentinels indicated to them the ease by which verbal messages get twisted, notwithstanding that each messenger was required to repeat the message.

The afternoon drill period was used for the purpose of applying the instruction previously given as well as to furnish work for Majors Fiske and McLean. It took the form of a problem which assumed the actual conditions which probably confront infantry supports, viz, the landing of a hostile army on the south shore of Long Island. The field officers were required to issue their field orders. This work was especially interesting; the attacking force of Major Fiske including a flank attack by Captain McAlpin and the defending force under Major McLean each performing its task in an excellent manner. The regular officers acted as quasi-umpires, taking notes of errors made and indicating to the defense

when to fall back so as to keep the problem moving. In the evening the errors observed by each regular officer were consolidated and the problem discussed before all the officers. Great interest was manifested in this part of the instruction. The same criticisms were repeated in the company streets. A talk by Lieutenant Baer on map reading was also given. Samples of cadet work had been taken to illustrate actual field maps.

Wednesday, June 12: The first half of the morning drill period was again devoted to extended-order drill, during which the terrain was studied by the field officers and the regular officers for the purpose of assigning the companies to their positions to repel landing parties and land attacks. The last half of the morning drill period was then devoted to the companies taking up and studying the possibilities of their assigned stations.

A full regiment is needed to fully form an outpost line for Fort Hamilton. The division of the regiment for these maneuvers, I believe, was an error, arising no doubt from the belief that the terrain was too limited. As large an initiative as possible was allowed to the company commanders after their stations were indicated.

There was no drill scheduled for the afternoon but there were plenty of volunteers when asked for to dig some type trenches. During the whole instruction period volunteers could be obtained at any time for anything. Advantage was taken of this fact to map the reservation, failure to have a military map having seriously hampered operations. The reservation and surrounding country was divided into 6 sections, the field notes of each section made by 4 volunteers from the same company and the notes consolidated under the direction of Lieutenant Baer. The results accomplished serve to indicate something of the talent concealed in every national guard regiment. It was further illustrated on Thursday morning when the district engineer officer informed me that he had some signal property which we could have. The opportunity was eagerly seized upon and within a few hours all the field telephones and buzzers were in working order under the charge of skilled operators, connecting our outpost line more than 2 miles in length. Considering the great burdens placed upon infantry under modern con-

ditions every regiment should be equipped with a complete buzzer outfit and at least 6 spools of wire with hand reel.

Thursday, June 13, and Friday, June 14, were consumed in the duties for which the troops had primarily been assembled. The first call to arms occurred about 2 p. m. Thursday and the companies proceeded at once to their stations, the Gatling guns on each flank having previously been placed in position. The commanding officer, Major Fiske, took up his station near the primary stations and in about twenty minutes had reports from the whole of the outpost line. The artillery district commander had previously informed me that we would have to detach parties from our own companies to represent attacks for the land side. Thursday p. m. 3 squads were sent out with plenty of ammunition to harrass the outposts by firing on them rapidly to conceal their strength, withdrawing under cover, reappearing at another point, etc. The officer sent with this force completely deceived one outpost by showing a squad, marching them around a building and showing them again, etc. Reports were almost immediately received at headquarters that 8, then 16, and finally a company of the enemy were seen, indicating the necessity for outpost commanders to sift carefully all information.

The attacking party succeeded so well in their duty that when they finally took up a defensive position and reinforcements had been sent to attack them the attacking force was very much surprised (and disappointed) to find that they were men from their own regiment.

The exercises for Thursday night consisted in an attempt by the "Navy" to land a party beyond our outposts on Gravesend Bay. They were discovered by a sentinel on the dock in front of the Field and Marine Club and signal was given by rockets fired from a Very pistol. This pistol is invaluable for such purposes and should be more extensively used for night work. On this occasion the signals adopted were, red, 1 boat sighted; white, 2 boats sighted; green, three or more boats sighted.

Friday morning was very thick and stormy and the fleet by 9 a. m. had landed a small force beyond our lines and showed themselves occasionally in the direction of Bath. It was believed that this was a feint and the supports remained on the defensive awaiting further developments. The exact

force of the enemy was therefore unknown when recall sounded. Friday afternoon the command was paid. As the State adds to the Federal pay sufficient to make up \$1.25 per day for privates much time and inconvenience could be saved by the Federal paymaster drawing his check for the total amount and turning it over to the State paymaster. During the present exercises the Federal paymaster paid the privates \$0.43 per day for the week and the State paymaster \$0.82, involving two payments.

Early on Friday night attacking parties were sent from our own force to try to pass the outposts but were unsuccessful. Later in the evening Lieutenant Thompkins from the "fleet" attempted a landing along the shore road, but was discovered and fired upon for some time before landing. He attempted to pass the outposts by showing what purported to be letters from the artillery district commander, but his party was searched and relieved of all of them including a "dynamite" (?) bomb. His purpose was evidently to put out the western searchlight. This terminated the exercises.

Police and sanitation.—The camp was kept well policed at all times, likewise the kitchens. Some difficulty was early encountered in preventing the men from using the latrines as garbage receptacles and in keeping the lime stirred up, but before a trial could be made to correct this the commanding officer sent to the city and hired a scavenger who devoted his whole attention to the latrine work thereafter and there was no trouble. In talking over this question with Major Fiske he agreed with me that the responsibility for the condition of the latrines was one which should devolve directly upon the men, but he stated that as long as they were in reach of hired servants the men would not take kindly to such work. It must be borne in mind in dealing with these regiments that the service is purely voluntary, calls for large sacrifices at all times, and a man can practically obtain his discharge when he wants it. The effect upon recruiting is therefore the first question which presents itself to the officers in every discussion. For example, had this tour of service consisted in merely watching the artillery this regiment would probably have lost more than 50 per cent of its men. As it is, they will probably gain at once plenty of men to organize their two new companies as required by the Dick bill.

The urinal troughs in the camp latrines were slightly defective in that the waste pipe did not completely drain the trough but backed up the urine for a couple of feet. Had warm weather occurred this might have proved unsanitary. Urinal tubs were used in the streets at night. There were six latrines in camp in addition to the officers', and while in a regular camp that would be sufficient (one for each company), an extra one should be provided at militia camps for servants. There were perhaps 25 colored servants in camp working for the regimental mess, the company officers, and company mess. A separate latrine for them is essential, as all militia regiments have about the same number of servants and the men do not care to use the same one as the servants.

The electric lights added immensely to the comfort of the camp and should always be installed where appropriations and power will justify it. The one thing lacking to make the camp complete was suitable provision for bathing. While the bath rooms of the regular garrison were available, the distance and the time during which they could be used make it extremely difficult to make use of them. Every effort should be made to provide shower baths, even though without hot water, within the camp limits. Arrangement should be made for telephone service to the city from the camp. The rules regarding passes was rigidly carried out, and many men were unable to communicate with their business houses when it was essential for them to do so.

The regiment is very completely equipped and has many conveniences and business-like methods which regular officers could study with profit. For instance, each company has a box about 1 foot square and 4 feet long, into which are telescoped a sufficient number of light galvanized pails and tin wash basins for each squad. They also have a similar compact and light box for tools (light shovels, axes, mallets, etc.). They use only cup, knife, fork, and spoon in messing, using wooden plates which can be burned with the garbage, thus avoiding the unsanitary method of cleaning meat cans. The quartermaster had a trunk used by commercial travelers, consisting of a multitude of compartments arranged as drawers and including a desk, in which he kept all the little things so much needed in camp—rope, nails, string, tags,

etc. In fact, the whole camp indicated business men in control.

As to whether these exercises were worth while there can be but one answer—decidedly, yes. This, however, must be understood to mean that there must be room in which to maneuver infantry. As long as these men feel they are accomplishing something they will undertake anything, but if they can only repeat, for lack of room, the close-order formations and drills to which they are accustomed in the armory they will not care to repeat the work. In the present case by doing a considerable amount of trespassing a great deal was accomplished. At my suggestion Colonel Appleton directed the adjutant to write a letter to the Dyker Meadow and the Field and Marine clubs thanking them for their kindness in permitting us to maneuver over their grounds. Had they objected the tour would have lost 50 per cent of its value to the regiment. The Government should make the same provision (by means of leases, if necessary) for the infantry work at these artillery exercises as it does at the maneuver camps.

It may perhaps not be beyond the proper limits of this report to say that the infantry supports during these exercises should be considered an integral part of the battle commander's forces and that he should give them the same importance in his plans that they must necessarily have in war. This would require his station to be connected by phone with that of the infantry commander. Failure to do this resulted on Thursday night in the lights being turned out at the infantry headquarters, no recall being sounded, and not for some time was it known that the phase was ended and the outposts, who had been soaked for hours, could be notified to come in. That the militia was piqued at this unintentional slight put upon their services I feel certain, although they carefully concealed their feelings. The defect was remedied before the next phase.

In conclusion I desire to say that the Seventh Regiment, National Guard of New York, on duty at Fort Hamilton, has returned to their vocations enthusiastic over the possibilities in this work, which if properly directed can not help but be of immense value. This camp cost one private from the Stock Exchange \$10,000. The vice-president of one of the

largest banks took his paying teller's place upon the earnest solicitation of the latter's company commander. One captain, a busy lawyer, wrote over 150 letters trying to arrange to have as many of his men present as possible. Every man who attended sacrificed something, but considering the time they can devote to their military work the results accomplished should give the regiment cause for sincere congratulation.

Letters from each of the company commanders are inclosed in answer to the question put to them: "What part of the work do you consider to have been of most value to your company?"

COMMENTS OF MILITIA OFFICERS.

[Colonel APPLETON, Seventh Regiment, National Guard of New York.]

Reports tour instructive and satisfactory and all appreciate efforts of Regulars in their behalf.

[Col. D. E. AUSTEN, Thirteenth Regiment, National Guard of New York.]

Expresses satisfaction at courtesies extended. Arrangements for subsistence and quarters best seen at any post.

Instructions imparted was thorough and while no service charges were fired men were interested in subcaliber practice. Men were pleased with their association with the Regulars.

[Maj. C. O. DAVIS, Thirteenth Regiment, National Guard of New York.]

States that tour of service was very successful and results very satisfactory to officers and men.

[Capt. BRYAN PENDRY, Thirteenth Regiment, National Guard of New York.]

Recommends that a regular officer and several regular non-commissioned officers be assigned to each company of State troops during exercises to devote their whole time to instructing and assisting them.

PROGRAM FOR EXERCISES.

[General Orders, No. 57, Headquarters Southern Artillery District of New York, Fort Hamilton, N. Y., May 20, 1907.]

1. The period for the annual encampment in this district will be: For Forts Hamilton and Wadsworth, June 3-17, 1907; Fort Hancock, July 1-15, 1907.

2. Before the arrival of the militia the command will be exercised as follows:

Artillery drill daily, one and one-half hours.

Night drill daily, one hour.

Call to arms on appearance of boats (names to be given later) or when ordered by the district commander.

Beginning June 8, for Forts Hamilton and Wadsworth, the following program will be carried out:

June 8: The whole garrison, officers and such men as are necessary, will assist in settling visiting troops, drawing rations, etc. As soon as practicable after camp is established the visiting troops will be paraded for muster.

June 9: The regular garrison will conduct the visiting troops through the fortifications (8-10, artillery reserves; 10-12, infantry supports). Afternoon, parade of infantry troops.

June 10: Artillery. Forenoon, instructions in forming company, nomenclature, and use of material. Afternoon, battery drill; Regulars followed by State troops. Night, battery drill; Regulars followed by State troops.

Infantry. Forenoon, company drill. Afternoon, instruction in outpost and patrol duty; parade.

June 11: Artillery. Forenoon, subcaliber practice for Regulars at Fort Hamilton; Fort Wadsworth, artillery drill. Afternoon, subcaliber practice for Regulars at Fort Wadsworth; Fort Hamilton, artillery drill. Night, fire-command drill.

Infantry. Forenoon, posting and relieving outpost; service of security and information. Afternoon, infantry drill; parade.

June 12: Artillery. Forenoon, subcaliber practice, State troops, Fort Hamilton. No night drill.

Infantry. Forenoon, (1) taking up position for repelling landing parties; (2) same for attack from land side. Afternoon, no drill; retreat.

June 13 and 14: Call to arms at beginning of phase; recall at end of phase.

June 15: Breaking camp and policing and restoring camp sites.

4. Corresponding exercises will take place at Fort Hancock July 1-15, 1907, the dates being changed to correspond.

All officers participating in the exercises will submit a report through military channels giving their observations and recommendations.

STATE OF NEW JERSEY.

Fort Hancock, N. J., Southern Artillery District of New York.

[Date of exercises: July 6 to 15.]

COMMENTS OF REGULAR OFFICERS.

[Col. HENRY L. HARRIS, Coast Artillery Corps, commanding Fort Hancock, N. J.]

For future exercises a site much nearer the post and nearly on the line connecting the Camp Low Battery and the secondary stations of the main base lines should be selected and prepared.

OBSERVATIONS.

1. The deportment and behavior of the men of this command was excellent. They served as good models for the visiting troops and it was noticed and commented on that the military deportment of the reserves who were associated with them improved to a much greater extent than in the case of the artillery supports.

2. The deportment and behavior of the militia was, on the whole, good.

Some of the enlisted men seemed to think that paying the proper respect to officers was optional with them, but I heard of no cases of bad behavior. Generally both officers and men were enthusiastic about their work in the reserves and supports as well, the only serious complaint coming from the company assigned to the mortar battery to the effect that the work was too hard for them, blistered their hands, etc.

There seemed to be an undercurrent of feeling, however, among the enlisted men that the week of their encampment being their annual holiday there was a little too much work and too little play about it. They were always ready for their work when the calls sounded and I gather from the reports of the officers on duty with the supports that there was no straggling from the ranks and no inclination to evade instructions.

As to the reserves, most of the men had never seen a sea-coast gun or carriage before nor had they any knowledge of the methods of determining corrected ranges and deflections.

They were given subcaliber practice at fixed targets, reports of which have been submitted, and range sections were formed and instructed.

The reports of the regular range officers indicate good progress, but all state that owing to the short time of the encampment the work of these sections was slow. This of course was expected.

As before stated, each company of the supports had an enlisted man (regular) attached as cook, to the advantage of those companies. The reserves being in the same camp with the regular company with cookhouses adjoining were helped out in the same way.

In future operations of this nature larger landing parties would increase the interest of the occasion to the supports. It is difficult for the average enlisted man to comprehend that one man may represent fifty or a hundred in the solution of a problem.

[Maj. W. E. ELLIS, Coast Artillery Corps, Fort Hancock, N. J.]

I judge, from my observations and my conversations with officers and men, that as a rule the militia were benefited by the exercises and were much interested in the work. There appears to be an awakening of sentiment throughout the State in favor of the organization of a coast artillery force of some kind.

[Capt. G. T. PATTERSON, Coast Artillery Corps, commanding U. S. Army torpedo planter *Major Samuel Ringgold*, in charge of attack.]

DAY PHASE, JULY 11, 1907.

This attack * * * was planned as a reconnaissance in force to develop the position of batteries, stations, etc. Owing to the thick fog which drifted in toward the Hook shortly before the time appointed for the attack, it was decided to change the plan and attempt a run by in the fog. led by the protected-cruiser squadron, all vessels to open fire on the batteries from the rear as soon as the ships were safely by the Hook and the batteries could be discerned.

Comment.—With such a thick fog the movement could hardly fail to be successful. In time of war many of the buoys would of course be removed. However, if the fog held, soundings could be taken from launches and the channel buoyed out. If the attacking commander possesses some knowledge of the local waters and sufficient nerve there is no real protection without a patrolled mine field.

NIGHT PHASE, JULY 11, 1907.

This attack was planned to consist in first sending ashore landing parties, if successful to be followed by a run past.

Comment.—With the restricted territory available for landings the proposition was very difficult. The supports were able to post a man every 20 or 30 feet along the beach. The protected cruisers and destroyers got by undiscovered, showing that the 36-inch light is not effective for the Swash Channel, especially if there is a slight haze or fog. The disabling of the large searchlight handicapped the defense very much and enabled the ships to get in quite close before being seen.

DAY PHASE, JULY 12, 1907.

This attack was planned as a reconnaissance in force accompanied by a landing directed against the infantry camp and wireless station located there, to be followed by demonstrations in the way of landing parties from the inner bay and a bombardment of the shore batteries by the battle ships.

It was carried out practically as planned in orders.

Comment.—The reconnaissance was successful in developing the position of the batteries, the fire being general. The landing was not successful as it was opposed by a considerable force, but it was intended only as a demonstration. The demonstrations on the inner bay showed that the infantry supports were on the alert at all points where landings were permitted.

NIGHT PHASE, JULY 12, 1907.

The plan for this attack contemplated getting the first battle ship squadron by the batteries under cover of a diversion by second battle ship squadron advancing up South channel. Also diversions by protected-cruiser squadron, destroyers, and launch *Watson* inside bay after having run through Swash channel, followed by landing parties.

The attack was carried out practically as planned.

Comment.—Whatever success this attack resulted in was due to the lack of searchlight equipment at Fort Hancock. To search 3 important channels, the outer beach, and the waters of the inner bay would require as a minimum 4 lights, and better, 5, 1 of which should be a 60-inch at the extreme end of the Hook. The new thoroughfares created between the infantry camp and central danger zone took enough men away from the shores of the inner bay to render the landing feasible, but the parties were in nearly every case stopped by the pickets on the roads. With a jungle like that at Sandy Hook the men had to strike either the road, railroad, or beaches.

GENERAL COMMENT.

The weather during the first phase was perfect for the attack and that during the second phase was very favorable, there being considerable fog. Large infantry supports would be needed at Fort Hancock to prevent landings, as there is an immense stretch of excellent beach. There was nothing particularly new about the lights. I think they were handled to the best advantage, but they were too few to be really effective. I watched the big light at Navesink several nights while coming in and noted the flattened effect of the beam and its great illuminating power as it rested momentarily on any of the ships. Some form of lens like this would be worth trying.

NOTE.—For programme of exercises held at Fort Hancock, N. J., see programme for New York militia, page 166.

COMMENTS OF MILITIA OFFICERS.

[Colonel MATHER, Third Regiment, National Guard of New Jersey.]

Recommends artillery corps for coast defense, recruited in larger cities mostly from machinists, electricians, mechanics; to be exempt from riot duty, as labor unions object to members joining militia.

States militia in fort in contact with regulars picked up habits of discipline better than the supports not at the fort proper.

Recommends dummy guns and plotting boards furnished for use in armories.

States coast artillery officer should be detailed with militia to instruct them during the winter months.

States service exercises should be held for two weeks at least.

STATE OF MARYLAND.

Artillery District of Baltimore.

[Date of exercises: July 5 to 14.]

COMMENTS OF REGULAR OFFICERS.

[Lieut. Col. CLARENCE DEEMS, Coast Artillery Corps, commanding artillery district of Baltimore, Fort Howard, Md.]

Their (militia) interest in artillery work will be encouraged. They have been invited to assist at such night drills as take place during the year and post transportation will bring them from Baltimore twice a month to participate in drill at Battery Stricker at night.

These infantry companies entered into artillery instruction with as much interest as though they were artillery organizations. Both officers and men were attentive and desirous of learning all they could of artillery subjects.

Capt. Guy H. B. Smith: It gives me great pleasure to report the excellent work accomplished by him as an instructor and in holding the interest of the infantry supports in their duties. He is especially fitted for instruction of militia and volunteer troops.

It is my belief a most valuable artillery reserve and supports can be developed if such plan is adopted, but as the art of war can not be learned in ten days I think it would be a great mistake to change the organizations from year to year assigned to this duty. Both the officers and men of the artillery company and the infantry assigned to artillery duty and as supports showed such loyal devotion to duty and desire to learn that it far surpassed my most sanguine expectations and I feel that they should be given the opportunities to continue their valuable work.

I desire to acknowledge the interest taken and assistance rendered by his excellency, Governor Warfield, of Maryland, Maj. Gen. Clinton Riggs, adjutant-general, Brig. Gen. Law-rason Riggs, brigade commander, Col. Charles A. Little, First Maryland Infantry, and his officers and men, Maj. M. A. Reckord, reserve fire commander, Capt. S. B. Austin, First Company, Coast Artillery, Maryland National Guard, and his enlisted men, and it gives me pleasure to note that there was not a case of disorder in camp.

[Capt. C. F. MORSE, assistant surgeon, U. S. Army.]

Liquid refuse was put in galvanized iron cans, removed daily by a scavenger, and thrown into the river, while garbage was burned, with the result that the ground adjacent to the kitchens was well policed.

[Capt. GODWIN ORDWAY, Coast Artillery Corps.]

The spirit shown by the artillery reserve was most commendable. Their company streets, tents, and kitchens were kept clean and orderly. There were no cases of disorder among the men. They responded immediately to suggestions and all seemed imbued with the desire to do everything properly. They frequently requested information and when errors were brought to their attention they not only received the remarks without ill humor, but were grateful for the correction.

Their men fraternized with our enlisted force and left with mutual expressions of good will. The camp was thoroughly contented. The only criticism I heard was that they were accustomed to more work at instruction camps.

The officers were vigilant, painstaking, and intelligent. It is worthy of note that on breaking camp they sent off their tents and baggage, leaving the camp grounds in exactly as clean a condition as it was upon arrival. There was not even a piece of stray paper left.

Speaking now particularly as battery commander I report that the manning personnel of the reserve went into their work with energy and intelligence. They were anxious to learn and grasped their duties very quickly. In their sub-caliber practice the range section was composed entirely of their men. While a considerable degree of accuracy was not

to be anticipated, the fact that they were able to get data to the pits in time for firing is of itself worthy of commendation, considering the short time for practice.

It is to be regretted that the programme did not allow them more time for drill, for which they were anxious.

I recommend that after they have expressed a desire and willingness to engage in the work they be furnished with some relatively inexpensive apparatus for practice at home.

For those companies living in cities adjacent to the forts I recommend that any day they express a desire to visit the fort for drill transportation and rations be allowed them for that day and that they be encouraged to come often.

The exercises here have brought forth such harmonious relations between the First Maryland and the officers and men of this garrison it appears desirable that our War Department should in every way encourage further contact.

[Capt. J. L. KNOWLTON, Coast Artillery Corps.]

This interest and intelligence have to my mind conclusively proven the ability of the militia to quickly assimilate the instructions given them and to put it into practice in a way which would render them of the greatest value as artillery reserves in case of war.

I respectively recommend: (1) that the same militia organizations, if practicable, be assigned to work with the Regular Army in each district once a year; (2) that the programme of work be decided upon and communicated to all concerned several months in advance; (3) that a larger number of militia be assigned to duty as artillery reserves in this district; (4) that the programme for the exercises be so arranged that a larger number of regular officers may be available for temporary duty in each district.

[Capt. A. W. CHASE, Coast Artillery Corps.]

The conduct of the officers and men in camp was excellent, not a single case of misconduct or disorder having been reported.

In conversation with Major Reckord and company officers of the militia I was struck with their great interest in all drills and practice and I was frequently asked if they would be allowed to visit the Fort during the coming fall practice.

[Capt. W. M. CRUIKSHANK, Fifth Field Artillery, U. S. Army.]

I have no recommendations to make except to recommend that the same militia regiment be sent here for similar exercises in the future, as almost without exception every officer and enlisted man of the First Regiment Maryland National Guard, and the First Company, Coast Artillery Maryland National Guard, took the greatest interest in this new work and the results were highly satisfactory.

[First-Lieut. RICHARD FURNIVAL, Coast Artillery Corps.]

Great interest and desire to learn was observed among the militia in every case.

INSTRUCTORS OF SUPPORTS.

[Capt. GUY H. B. SMITH, Fourth Infantry, U. S. Army.]

In reference to the instruction of the National Guard, it is recommended that in addition to detailing therewith a competent Regular Army officer as instructor steps be taken to encourage instruction or independent study in the various organizations prior to their arrival at the post. The ignorance of many of the men concerning the simplest elements of military art was most appalling. An "outpost," "picket," an "advance guard," were to many abstruse terms. If the men had a general idea of the subjects before coming to the exercises the necessary details could be easily acquired. Many of the men could be appealed to by small pamphlets, setting forth in conversational style the general outlines of a subject, the pamphlets being copiously illustrated with photographs and clever pen drawings. Such little pamphlets could be compiled by competent officers and sold at cost price to the State troops. Where possible instruction should be given the organizations by their company officers. In this way the troops would have at least a general idea of the subject, and this knowledge could be elaborated upon as opportunity offered.

In conclusion, I desire to state that the regiment, as a whole, evinced a great interest in the work, was anxious to learn, and entered into all the exercises with a spirit that was most commendable.

COMMENTS OF MILITIA OFFICERS.

[Col. CHAS. A. LITTLE, commanding First Infantry, Maryland National Guard.]

The regiment was very greatly benefited by its tour of duty at Fort Howard, both in what it was taught practically and in what it learned theoretically, and I can conceive of no better training for the national guardsman than to have him thrown with and to work with the soldier of the Regular Army. He will learn more in one day from observation than he can be taught from the book in a long time.

All were delighted with the work and would most gladly respond to another call for similar duty.

[Maj. A. M. RECKORD, First Infantry, Maryland National Guard.]

The programme of events was exceedingly well arranged, and while it provided for a great deal of work and instruction it also allowed the men plenty of time for recreation, thus combining work with pleasure and making the camp the most enjoyable as well as the most instructive it has been my good fortune to attend.

There is no doubt in my mind but that the men if kept at this work continuously would be of much service in manning our coast defenses in time of war.

I am sure every officer and man of the battalion would gladly accept such an assignment, and I believe the entire regiment would do likewise.

I hope it may be found advisable to have these exercises each year, and in that event it is my earnest desire that it may be my good fortune to have the same assignment in the future that I have just enjoyed.

[Capt. D. JOHN MARKEY, First Infantry, Maryland National Guard.]

The men of this provisional company would prefer coast-artillery work in preference to the other branches of the service.

I would recommend that in the event of future tours of duty in coast-artillery work that the militia be given more work on the guns and the Regulars be held in reserve, that after the preliminary instructive drills by the Regulars that the militia man the guns under the direction of the Regulars at all drills during their camp of instruction.

If it is not practicable to use the range section after the first few drills, use all but the plotter and then use him as soon as possible.

I asked every man in my company this question personally: "Would you in the event of actual war be satisfied to be sent and stationed at Fort Howard and take up the important work that you have had there in the past ten days and become a part of the defense of our State and Baltimore?" Every man answered in the affirmative.

[Capt. WALTER R. MCCOMAS, First Infantry, Maryland National Guard.]

I have interviewed a majority of them and without a single exception they expressed themselves as being pleased with the service and all are very anxious to return next summer.

[Capt. GEORGE L. FISHER, First Infantry, Maryland National Guard.]

The aptness of the men in taking to the work and drills was very gratifying.

On the whole I can say that, so far as I am able to give an opinion, the instructions received by my men were very beneficial and were they to be called upon for actual service in this particular branch they could do most effective work.

[Capt. S. B. AUSTIN, commanding First Company, Coast Artillery, Maryland National Guard.]

Having been instructed to comment on any defects that came to my notice I must report that it is evident the present force of officers and men seems utterly inadequate for the proper manning of the fortifications. In time of actual warfare, when the period of expected attack might continue for days at a time, it would be obviously impossible to keep men at their posts continuously, as was done during this simulated attack, and to expect good service of them.

I must also take this opportunity to express my appreciation of the courtesy of the officers and men of the Fortieth Company and all members of the Regular Establishment with whom I came in contact. The kindly and painstaking interest shown by all of them was of inestimable benefit to my command and will be long remembered.

[First Lieut. HENRY A. SHERTZER, First Infantry, Maryland National Guard.]

I was in a position to see and hear the comments of the men of our different companies and have yet to hear one single complaint. All the men were sorry when they left and are very anxious to return, and I trust that the time may be soon for us to return to Fort Howard.

[Second Lieut. ROBERT H. ARCHER, Jr., First Infantry, Maryland National Guard.]

The work was both instructive and interesting, and I think I am correct in saying that there is not a single man in our battalion who does not hope to return to Fort Howard next summer.

DISTRICT OF COLUMBIA.

Artillery District of the Potomac.

[Date of exercises: July 18 to 28.]

COMMENTS OF REGULAR OFFICERS.

[Lieut. Col. WILLIAM H. COFFIN, Coast Artillery Corps, commanding Artillery District of the Potomac.]

All supplies pertaining to this department were received in ample time and when the regular troops went into camp everything was in readiness for the accommodation of both regulars and militia.

But little time was devoted to position-finding stations and this only in a general way, as it was deemed advisable by me that the officers should know the armament first and the time was very short. That the instruction given to the reserves was thorough is evidenced by the fact that the militia manned the guns fairly well by themselves before the exercises were over.

I think much valuable instruction has been imparted to the militia. They came here unwillingly and from appearances and from what I could hear went away more unwillingly.

It is to be hoped that these exercises will be repeated next year and more time allowed. The naval militia would be glad to join in them, but would like a little more time for preparation.

[Maj. G. W. S. STEVENS, Coast Artillery Corps, fire commander, Fort Washington, Md.]

The interest taken by the reserves of the militia was marked, and this interest naturally led to relative smoothness in handling the batteries and generally to a condition above the original expectations as to results. The general behavior of the enlisted men of both reserves and regulars during the exercises was most satisfactory. The personnel at the batteries apparently worked without friction, as the manning on sudden call was prompt and report of readiness for action was received promptly in every instance. The general schedule for the exercises and for the encampment was generally carried out as outlined; and this provided for an opportunity for the reserves to study the guns and range-finding systems and for the supports to familiarize themselves with the reservation between the 21st and the night of the 23d of July. The reserves were able to actually drill at the guns more quickly than anticipated.

[Capt. P. S. GOLDERMAN, Coast Artillery Corps, district artillery engineer and ordnance officer.]

ENLISTED PERSONNEL, MILITIA.

The discipline and appearance was generally good and the interest and application certainly gratifying.

[Capt. A. T. BALENTINE, Coast Artillery Corps, commanding Fort Hunt, Va.]

MILITIA.

The militia at this post were well disciplined and earnest in their efforts to learn their duties. I regret that the period of the encampment was for one week only and recommend that future exercises cover a period of two weeks.

[Capt. E. N. MACON, Coast Artillery Corps, commanding Seventeenth Company, Coast Artillery Corps, Fort Washington, Md.]

The militia company assigned as a reserve was composed of 23 Washington high school cadets. It was the smallest of the companies and the average of membership least. The appearance and discipline of the company was good. Officers and men were given as full opportunity as their limited stay permitted to see and learn all parts of the drill both at P. F. stations and guns. They exhibited great interest in the work, asked numerous questions, and seemed greatly pleased in

performing the various duties assigned to them at drill. Their services were of value in firing the blank charges.

The regulars and militia fraternized admirably and the novelty of the association was evidently inspiring to both.

The militia company undoubtedly acquired a great deal of knowledge which should render their services of value as artillery reserves in any sudden emergency.

In the accomplishment of the object desired the exercises impressed me as being the most completely successful of all that I have witnessed.

[Capt. G. F. CONNOLLY, Coast Artillery Corps, commanding Forty-fourth Company, Coast Artillery Corps, Fort Washington, Md.]

This company (G, Second Regiment) seemed to be well instructed in the necessary duties to be performed in and around the camp, which they kept in a good, clean, and sanitary condition.

After a period of two days, during which time they were instructed in the practical handling, maneuvering, and nomenclature of the guns and the material, one gun was manned entirely by the reserve company; they showed a great anxiety to learn and proved very proficient and apt.

Two noncommissioned officers and one private were placed in the primary station, where they acted in the several capacities of observer, plotter, and deflection computer; the work of these men was very good.

It is my opinion that if these reserves were given an annual training of at least fifteen days a degree of efficiency could be reached which would amply justify the expenses incurred and prove of great value in time of war, thus enabling the Artillery Corps to be expanded to its full working strength as well as having ample reserves.

[Capt. W. R. DOORES, Coast Artillery Corps, commanding One hundred and fourth Company, Coast Artillery Corps, Fort Washington, Md.]

The men of this militia company (E, Second Regiment) were quite intelligent and were interested in the work.

The last day of drill was conducted by the officers and enlisted men of the militia company and I was personally much pleased with the work. In general, I wish to say that the work by the militia company was very satisfactory considering the limited time devoted to the instruction.

[First Lieut. J. P. TERRELL, Coast Artillery Corps, adjutant, Fort Washington, Md.]

With reference to the joint exercises it seems proper to note that the militia, both officers and men, have taken a great deal of interest in the operations and have shown during the entire period the greatest enthusiasm. The militia companies were extremely small, averaging about 26 men, but it is hoped that in future exercises the companies will be more complete.

I think mention should also be made of the way in which the regular troops have performed their duties. Although on account of the depleted condition of the companies each man has had to do the work of at least two men he has done it in the most cheerful manner and with a spirit that was very praiseworthy.

In closing I wish to state that these exercises have been of great value to me personally, as I have gained a practical knowledge of methods of attack and defense and have gained ideas in these matters which I could have learned in no other way.

[First Lieut. J. K. CRAIN, Coast Artillery Corps, assistant district artillery engineer, Fort Washington, Md.]

It is believed that the militia coast artillery exercises are to be held each year. If this were done and an approved plan of defense were drawn up locating the trenches of the supports a part of these trenches could be thrown up by the militia each year. The forts would gradually become intrenched camps and time and labor would be saved in case of war.

[First Lieut. EARL BISCOE, Coast Artillery Corps, range officer, Fort Hunt, Va.]

It is believed that better results would be obtained if the militia served with the Regulars for two weeks instead of one, making it possible to give them one week of instruction and one week of actual work. It is impossible to put green men in the stations and still carry out the work required in the past exercises.

[First Lieut. C. H. PATTERSON, One hundred and fourth Company, Coast Artillery Corps, Fort Washington, Md.]

In a remarkably short time the Company E detachment was able to drill without further instruction. The men were eager and quick to learn and entered upon their work with a vim. Their discipline was excellent. I tried as an experiment mixing the detachments, not having enough men from Company E to man both guns, but I had poor results and found that it was far better to have one gun manned by a complete regular detachment and the other by a complete militia detachment. I made this an invariable rule at drill.

In cleaning the guns the militia were not directed to assist, but they were eager to learn how to take care of them and they entered into the unpleasant part of the work in the same spirit as into the other.

The men were enthusiastic about artillery work and I heard regrets from them at the necessity for their early home going.

The work accomplished proved what in an emergency untrained men in the presence of trained men can do.

INSTRUCTORS OF SUPPORTS.

[First Lieut. E. H. RUBOTTOM, Ninth Cavalry, U. S. Army, Fort Washington, Md.]

The entire work during the joint maneuvers was not only pleasant and extremely interesting, but profitable as well to the instructors, and judging from appearances and from the statements of militia officers was equally so to them. In fact, I was repeatedly told that never in any former maneuver or encampment had they learned half so much nor found the work half so pleasant and interesting with so little fatigue to both enlisted men and officers.

[First Lieut. F. W. DAWSON, Nineteenth Infantry, U. S. Army, Fort Hunt, Va.]

Wish to state that great interest was shown by the officers and men in these exercises and every officer and man was very willing and anxious to make the work a success.

The officers showed remarkable skill in handling their men and there was perfect harmony in all work performed by the company.

[First Lieut. S. O. FUQUA, Twenty-third Infantry, U. S. Army, Fort Hunt, Va.]

I believe that a great deal of good was obtained by the infantry supports in this manner and that the plan of sending infantry and cavalry officers to instruct in this work is most excellent. The regular officers were constantly with the militia in the patrol, reconnoissance and outpost work and between times the officers mingled socially in a way that brought excellent feeling and promoted fellowship and development along professional lines.

[Second Lieut. B. T. MERCHANT, Thirteenth Cavalry, U. S. Army, Fort Hunt, Va.]

I watched particularly the fire discipline of the command—Company D, Second Regiment—and will say that it was excellent.

The regular and militia officers have worked together with the greatest harmony and I know that the militia leave here feeling that their time has been profitably employed and that they have learned something of a branch of the service of which heretofore the great majority were ignorant.

[Second Lieut. J. T. DONNELLY, Thirteenth Cavalry, U. S. Army, Fort Washington, Md.]

In view of the results obtained during the brief period of exercises just completed and the interest taken in this line of work by all or a great majority thereof who participated, I would recommend that next season the entire dismounted militia force of the District of Columbia be given an opportunity to take part in the exercises and that the period of same be extended to two weeks. If this should be impracticable then the companies sent here should be recruited to their full strength. The companies detailed this year for the supports and reserves were too small.

[Second Lieut. M. C. BRISTOL, Thirteenth Cavalry, U. S. Army, Fort Washington, Md.]

The attention and interest in the work shown by this company—Company K, Second Regiment—were excellent, all the men being willing to work and quick to learn.

[Second Lieut. R. J. WEST, Twenty-sixth Infantry, U. S. Army, Fort Hunt, Va.]

Not only the officers, but the noncommissioned officers and privates were very enthusiastic, if not overzealous, in taking advantage of the assistance offered them and in the performance of such duties as were assigned to them. The members of both companies were prompt and cheerful in obedience to orders of superiors and beyond a doubt profited by their association with the Regular troops stationed at this post.

Those responsible for the discipline and instruction of the militia companies of the Fourth Battalion, National Guard District of Columbia, previous to their arrival here deserve a great deal of credit for the general good appearance and efficiency of their respective commands.

CONCLUSION.

In order that all parties participating in the maneuvers at a place of this kind might derive the maximum benefits it is believed that a regular and definite scheme be previously prepared, involving the various phases that might arise in time of war and thoroughly studied out in the form of map problems; that definite orders, as prescribed in Field Service Regulations be prepared and given to the commanders of each force and the chief umpires; that maps of suitable size be furnished indicating the most important topographical features.

COMMENTS OF MILITIA OFFICERS.

[Lieut. Col. R. A. O'BRIEN, Second Regiment, National Guard District of Columbia, commanding supports, Fort Washington, Md.]

I desire to state that the treatment accorded the officers and men under my command at Fort Washington for courtesy and kindness has never been equaled in my experience of twenty years as a militia officer.

The officers and men were much benefited by their instructions in patrol reconnaissance and outpost duty.

[Maj. ANTON STEPHEN, Second Regiment, National Guard District of Columbia, commanding supports, Fort Hunt, Va.]

The arrangements for camp were most satisfactory and everything was done for the comfort of both officers and men by the officers of this post as well as the officers from the

Army detailed as our instructors. In this connection I desire to say that this camp has proven to be the most beneficial in the history of our organization. The instruction imparted has been eagerly sought and promptly applied. It is my firm opinion that the benefits will be of a lasting character and will eventually revert to the benefit of our Army in particular and to our country in general.

It is only due the officers of the Regular Establishment that I briefly state that their efforts have not been wasted and that their patience and uniform courtesy has made them our friends.

Captain Balentine, together with the officers of this post, have labored hard for our comfort and have left nothing undone which would add to making our stay more beneficial or instructive. Every facility was given to acquire the intricate knowledge of the work of the Coast Artillery. Our instructors detailed to us from the Regular Army have closely followed the work of this command and have been uniformly courteous and obliging.

My officers think that their assistance has been most valuable and will result in much good.

We desire at this time to record our sincere appreciation for the instruction imparted and assistance rendered by these officers.

[Capt. A. R. MCGONEGAL, commanding Company C (reserves), First Regiment, National Guard District of Columbia, Fort Hunt, Va.]

I believe the close association of my men with those of the Forty-seventh Company, Regulars, for this short period to have done more for the advancement of discipline than in any previous encampment that I have attended. The men on the whole have been orderly, industrious, and eager for their part in the various drills and maneuvers. The drills were short, thorough, and numerous, and many were in answer to "To arms" at unexpected times, which I consider a good feature.

I also believe that it would be well to consider the advisability of arranging to give this company (as well as others which have been assigned to similar duty) a night artillery drill at least fortnightly during the summer months, as the handling of large guns requires a dexterity and knowledge

that can not be gained in a week. This is particularly true of range work and the positions assigned to the officers and some of the noncommissioned officers. For instance, a naval militia launch could leave Washington at 7 p. m., bring the company or selected members to Fort Hunt, take plenty of time for the regular night drill and reach the Washington wharf again at 10.30 or 11 p. m. This work of course would be entirely supplemental to and not interfere with the regular infantry drill season, which is suspended after camp until the late fall.

[Capt. SAMUEL FELAND, commanding Company B (supports), Second Regiment, National Guard District of Columbia, Fort Hunt, Va.]

It is my belief that the encampments with detailed officers from the Regular Establishment are of great importance and are beneficial to the militia and detailed officers. It is also of great importance as it brings the regular and the militia on a more friendly basis. Personally, I feel deeply indebted to the officers of this post, as they have shown us every courtesy and kindness and have worked faithfully in every possible way to instruct the officers and enlisted men.

[Capt. T. V. WALKER, commanding Company C (supports), Second Regiment, National Guard District of Columbia, Fort Hunt, Va.]

The scheme of having the officers, noncommissioned officers, and selected privates outlining the enemy, capturing scouts, officers, orderlies, outposts, etc., of the opposing army, each one taking the subject on the field, making report, and turning in at the conclusion of each proposition, is about the best exercise we had, making the noncom. a responsible man.

From these exercises I feel that the War Department has not lost by its efforts to get the value received.

While the week here has not been a hard one, yet it has been a very strenuous one, the hurry call to arms, up at night, drilling in the day, etc., the excitement of these drills is what kept up the nerves of the men. In my company I have had few complaints as to the work. The time in camp of the National Guard is so limited I do not see how the Department could lessen the work. The close touch that the guard of to-day is getting with the Regular Establishment is one of the best things that has ever happened for the War Department and for the whole people.

The discipline of the National Guard, District of Columbia, men is better, because they try to imitate the regular soldier.

[Capt. C. V. SAYER, commanding Company G (reserves), Second Regiment, National Guard District of Columbia, Fort Washington, Md.]

There is no doubt in my mind that the militia can be trained by the system mapped out at this post to be excellent artillerymen. The pains taken by the officers and enlisted men of the Forty-fourth Company, Coast Artillery Corps, to instruct the reserve company, produced results that seemed at first impossible to reach.

I wish to thank the officers of the post for the courtesy and interest they have shown at all times in instructing the officers and men of my command.

[Capt. R. B. CLAYTON, commanding Company L (supports), Second Regiment, National Guard District of Columbia, Fort Washington, Md.]

The camp was the best arranged and most convenient of any I ever saw. The instruction was always interesting to officers and men and there was much done in the short time we had. I believe we absorbed more useful military training from this year's camp than ever before and wish it could last longer. The programme and arrangements all seemed perfect and well thought out.

[First Lieut. C. F. ROBERTS, adjutant Fourth Battalion, National Guard District of Columbia, Fort Hunt, Va.]

I desire to add from observation that not only has this camp been productive of a better understanding between the officers of the Regular Army and the militia, but the men also worked together in perfect harmony, and the instruction received under such conditions can not but prove to be of an everlasting benefit to militiamen. In this connection I would suggest that whenever the opportunity presents itself the plan followed in this encampment during the maneuvers here should be followed out wherever practicable.

[First Lieut. T. F. MCANALLY, quartermaster Fourth Battalion, National Guard District of Columbia, Fort Hunt, Va.]

From my observations I should say that the maneuvers here have been of such great value to the militia as to warrant their continuance in the future.

[First Lieut. J. E. REDMAN, Company F (reserves), Second Regiment, National Guard District of Columbia, Fort Washington, Md.]

The entire company without exception was greatly pleased with the novelty of the drills, etc., at the big guns. They were also pleased with the position-finding instruments on account of having studied trigonometry and surveying.

[First Lieut. A. W. LEONARD, Company G (reserves), Second Regiment, National Guard District of Columbia, Fort Washington, Md.]

We received more actual knowledge of outpost, advance-guard, and patrol work than at any previous three camps combined. I do not hesitate to say that with larger companies and better instructed noncommissioned officers, greater results still can be obtained, as the work at this encampment has not been beyond the endurance of any man. I feel that should we again return our companies will be greatly augmented and in better condition. A fact that should not be overlooked is that the line officers and especially the seniors had their first opportunity in taking part in all movements, and this encampment to the backbone of the militia will bear fruit.

[First Lieut. F. D. LACKLAND, Company K (supports), Second Regiment, National Guard District of Columbia, Fort Washington, Md.]

My company was designated as part of the support and our work as such, along lines as near like service conditions as possible, was far more instructive than any work we have ever had.

The idea of assigning an instructor to each company was to me a good one. It aroused more enthusiasm, which for militia with their short encampment I think necessary. Taken as a whole, the work so far as I can see was far more beneficial than anything I have ever seen in a military camp of instruction.

[First Lieut. HUGH KENEIPP, Company L (supports), Second Regiment, National Guard District of Columbia, Fort Washington, Md.]

The exercises at Fort Washington in which the militia of the District of Columbia have participated have been more instructive and profitable than could have been expected.

The presence of an officer of the Regular Army with each company to supervise and instruct I believe to be more ad-

vantageous than any amount of maneuvering on a large scale, and I feel sure that the officers of the militia, generally, would be glad to have such an opportunity repeated in the future.

[Second Lieut. C. B. HARWOOD, Company A (supports), Second Regiment, National Guard District of Columbia, Fort Hunt, Va.]

As this is my first experience in this work, I feel that from the information which I have gained by my own observations and instructions given by able instructors I have made a good start toward perfecting myself in these intricate problems of advance and rear guard formations.

[Second Lieut. W. H. BECKSTEIN, Company C (supports), Second Regiment, National Guard, District of Columbia, Fort Hunt, Va.]

Our operations of the week have been more beneficial to us than any I have attended, this being my eighth encampment.

Harmony among the officers of the regulars and militia as well as the men has been shown more at this encampment than any.

Going in the fields, making sketches, and learning the terrain of the country is something we never did before and if kept up will produce better results, more so in outpost duty, as well as advance and rear-guard duty.

In my opinion the men care more for this kind of work and if kept up will find our militia greatly strengthened each encampment.

[Second Lieut. B. F. STEWART, Company I (supports), Second Regiment, National Guard, District of Columbia, Fort Washington, Md.]

Was well instructed in Cossack outpost duty and patrolling.

In all the encampments of the National Guard, District of Columbia, which I attended was never more interested and instructed in the art of attack and defense as I have in this one. Also find the men very well pleased with the instruction they have received, and a desire to stay longer.

In the coming year (1908) I hope the encampment of the National Guard, District of Columbia, will be for a longer period with just such instructions as we have received in this one.

[Second Lieut. T. S. O'HALLORAN, Company L (supports), Second Regiment, National Guard, District of Columbia, Fort Washington, Md.]

The benefit to the militia and thereby to the country, I think, is very great and should be continued. One great benefit was in having a Regular Army officer detailed to each company, as it enabled the instructor to get in closer touch with the officers and men, which I think brings better results and should be continued.

Another point is that the militia is brought more closely before the public in the efficiency of the militia. The advantage gained by the militia is so great that everybody concerned is, I am sure, hoping for more of it in the future.

STATE OF SOUTH CAROLINA.

Artillery District of Charleston.

[Date of exercises: July 5 to 15.]

COMMENTS OF ARTILLERY OFFICERS.

[Col. G. G. GREENOUGH, Coast Artillery Corps, commanding artillery district of Charleston, Fort Moultrie, S. C.]

The South Carolina management was such that some of the companies did not receive their blankets until the day after their arrival. Fortunately the weather was warm.

All the South Carolina companies had to be held in Charleston to enable the regimental quartermaster to issue them clothing and equipment. The regimental commander had assured me that every effort had been made by himself and his officers. That there had been no delay in the asking or in the following up of requests, thus the delays were seemingly in the office at Columbia.

None of the militia had muster or pay rolls ready. They were informed, so they stated, upon applying to Department headquarters that all blanks, including muster rolls, would be issued to them here. General Orders, No. 99, War Department, current series, states very plainly that all rolls should be prepared before leaving home and that the pay-

master-general's officer in Washington would send, in season therefor, the blanks to the various organizations from his office.

Although the lectures took place as scheduled there were too many absentees. To enable the officers to give undivided attention to the men at first and also to bring all in contact at the earliest moment, the commissioned officers of the militia and post met at supper at my quarters and were piloted therefrom to the gymnasium for the first lecture at the specified hour.

Although mustered the day after arrival the rolls were not available until July 11 and 12, 1907, because the blanks had not been supplied as required by page 6, General Orders, No. 99, War Department, current series, and did not reach post until 11 a. m. July 9. Consequently the payment had to be made during a rain storm Sunday afternoon, July 14.

During this encampment to instruct 14 companies of raw militia, to say nothing of an equally raw field and staff, there were but 8 company officers, one of whom was also district and constructing quartermaster, with a great deal of constructing work. Six of these officers had in addition companies and batteries to look after.

In conclusion I will state that throughout the recent encampment I was greatly pleased to note the unflagging interest of the visiting troops and the readiness with which a large percentage familiarized themselves with the drill; also the great improvement shown by the end of the encampment in attention to minor details, courtesy, promptness at formations, etc. All of which confirms me in the belief that a continuation of such joint encampments will lead to a great improvement in the National Guard as well as have a broadening effect upon the Regular Army itself, which latter has gained in experience in dealing with such troops, so that at another time much improvement should appear in the handling of the instructions and in avoiding the contretemps of this encampment by earlier and more complete preparations.

I feel that the National Guard of South Carolina have carried away with them much that has caused them to think deeply and to induce them to greater efforts to perfect themselves in soldierly qualities, in bearing, tidiness, outward and

real respect to and for their superiors in military rank, and to take such steps as will win them a stronger title to the respect, esteem, and support of their neighbors and the public at large.

While having endeavored candidly to note their present weaknesses and shortcomings, nevertheless they left carrying with them our very real respect and cordial good will as a result of their interest and earnest work.

The next encampment will show what the actual benefit of this one has been. I hope to see far greater snap, precision, knowledge of paper work and drills, consequently better target results.

For the best results however steps should be taken to organize the artillery reserve regiments as Coast Artillery in accordance with our organization.

[Maj. W. P. STONE, Coast Artillery Corps, commanding battle and first fire command.]

I performed the duties of battle and fire commander of the first (the only) fire command.

The programme of exercises and problems given in General Order 2, current series, artillery district of Charleston, so far as relates to my duties, was carried out. The lectures of July 6 were poorly attended. With this exception the first period was well utilized in the preliminary instruction of the militia at the guns and stations.

I suggest the following for the improvement in future exercises:

First. A thorough study of orders by the militia prior to and during encampment. It was often painfully evident that the militia had failed to even read very important orders.

Second. Arrangements for the next encampment should begin now, not next June.

Third. The militia should be held to the same property accountability and muster requirements as the Regular Army.

Fourth. Manning tables should be made out prior to next encampment.

Fifth. Every militia library should be as complete as possible.

[Capt. R. F. McMILLAN, Coast Artillery Corps.]

I am of the opinion that in the future it might be better if the militia of one State were sent to maneuvers in another State at a distance from their home, the commanding officers of the organizations having informed me that it was impossible in many instances to secure the attendance of the members of their companies. These same men they say would undoubtedly have attended had the maneuvers taken place at a distance from their homes.

I believe that in future the maneuvers in this district should take place not later than the 1st of June. The climatic conditions at that time as regards temperature and rain are apt to be much more favorable and there are no mosquitoes. Our own men having just passed the period of outdoor instruction are better drilled than they are one month later in the indoor period.

The militia troops under my immediate command consisted of Companies A, B, H, and K, Third Regiment. Their behavior, with very few exceptions, can not be commended too strongly. They were willing at all times to learn and showed a most commendable interest in acquiring a working knowledge of the handling of the material intrusted to them.

The knowledge of military customs on the part of some of the officers and many of the men was not all that could be desired on their arrival here, but it is believed that their close contact with the regular organizations was of benefit to them in this regard and a noticeable improvement was observed. The infantry manual and knowledge of guard duty was not good. Many of the men and some of the officers wore black shoes with khaki uniforms, and many of the men wore colored cravats with the blue chambray shirts. Not all men had blue shirts. The laxness in regard to uniforms is possibly a minor detail and easily corrected.

In conclusion, I wish to say that I believe it is of the greatest benefit for both the regular artillery and militia to serve together under the close relations which obtain in encampments of this kind.

The adaptability and quickness of the militia to take hold have been sources of pleasant surprise to me. The relations between the enlisted men of the two branches left nothing to be desired.

[Capt. J. B. MITCHELL, Coast Artillery Corps, commanding Seventy-fifth Company, Coast Artillery Corps.]

Taken as a whole, it is believed that these exercises were of the greatest benefit and if kept up each year and the same companies of militia given assurance of being assigned to the same batteries it is thought that good progress has been made toward finding a reserve for the Coast Artillery in time of war. The companies of militia assigned to the battery performed their duties as artillerymen in a most satisfactory manner, and too much praise can not be given them for the interest they took in the work. Both the officers and the men were at all times eager to learn and responded to every call of duty in a prompt and cheerful manner.

[Capt. J. S. JOHNSON, Coast Artillery Corps, commanding Seventy-eighth Company, Coast Artillery Corps.]

The officers and enlisted men of the militia troops, with very few exceptions, were apparently very much interested in their work and displayed a highly commendable degree of zeal and aptitude in acquiring a knowledge of their duties. Their behavior while in camp was excellent, not one serious breach of discipline having occurred in the camp. It is reported that some of the enlisted men committed themselves while absent from the camp, but these cases were not reported to me officially. There was at first some laxity in the matter of turning out for formations, but this defect was very soon corrected, and during the period of hostilities their promptness in responding to calls was excellent. The militia companies did not at first give sufficient attention to sanitation, but it is believed that this was due to ignorance rather than carelessness, as defects were immediately remedied whenever pointed out.

A marked improvement has been observed in the military bearing of the militiamen and their observance of military courtesies.

It is respectfully recommended that future exercises be held at a more suitable time of year, provided that such an arrangement would be satisfactory to the militia troops. The opinions of the militia officers differ on this point, some holding that the present is the best time of year for them and others that the latter part of May would be better.

While the militia officers and men with a few exceptions were zealous in their efforts to make themselves proficient in the duties to which they were assigned, it was impossible, in the limited time available, for them to acquire more than a superficial knowledge of those duties. Should the exercises be repeated next year, the value of this knowledge can be determined; but in my opinion it will be found to be very small unless it be supplemented by some system of Coast Artillery instruction during the intervening period. It is therefore recommended that each Coast Artillery reserve company be provided by the Ordnance Department with one or more working models of the type of gun to which the company is assigned.

[Capt. A. MOSES, Coast Artillery Corps.]

In addition to my regular duties as artillery engineer and ordnance officer, I performed during the exercises the duty of communication and searchlight officer at the F' station. The militia officers and men with whom I was associated seemed to be enthusiastic and anxious to learn everything possible in connection with their duties. The camping of militia and regular companies together was undoubtedly most beneficial to the militia and I believe it resulted in marked improvement in military courtesy, discipline, etc. The practice of assigning militia officers and men as understudies to the Regulars is in my judgment excellent, and at the close of the exercises many militiamen were able to render valuable services at the guns and position-finding stations.

The boat service was inadequate and the efficiency of the exercises would in my judgment have been greatly increased if four or five tugs could have been under the absolute control of the commanding officer. The need of more regular officers to give proper instruction to the militia was apparent. Drill regulations should be furnished a suitable time in advance to militia organizations so that they may come to the practical work with some theoretical knowledge of their duties. For future exercises in this district it would in my judgment be desirable to have one regiment of militia assigned as artillery reserves and one regiment as artillery supports. The Naval Militia of South Carolina should have their exercises at the same time and operate during the period

of simulated hostilities as the "enemy." In conclusion, I believe that despite the handicaps the exercises proved beneficial to both the Regulars and the militia and should be continued.

[Capt. T. J. KIRKPATRICK, assistant surgeon, U. S. Army.]

By General Order 25, Fort Moultrie, S. C., current series, I was placed in command of the field hospital.

The health of the command was excellent, 6 cases of malaria imported from home towns being the prevailing disease.

[First Lieut. W. N. MICHEL, Field Artillery.]

District quartermaster since June 13, 1907, supervised preparation of camps for Regulars and militia.

During the drill period as much time as practicable was given to the instruction of the militia officers and enlisted men and during the subcaliber practice of the militia companies at Battery Jasper the station was manned and operated by the militia officers and enlisted men.

These officers and men showed considerable aptitude and an earnest desire to master the work. By the interest displayed and the results obtained I am led to believe that a continuation of these combined exercises in the future will provide an efficient reserve in the militia for coast defense.

[First Lieut. J. M. FULTON, Coast Artillery Corps, Commissary.]

Attention is invited to the apparent carelessness of the commanders of these organizations in regard to the subsistence of their companies—only 3 officers of the South Carolina regiment came to the commissary to draw rations on the day of their arrival. It was necessary for the undersigned to go in person with rations to some of the other companies—notably Companies H and K encamped at Battery Capron—rations were taken up to them at 9.30 p. m.

I wish to express my appreciation of the zeal and care shown by First Lieut. Donald Frost, Third Regiment National Guard South Carolina, in his dealings with this Department as well as the great help he gave me in getting rations issued to the entire regiment during the evening and night of its arrival.

[Comments of District Commander Colonel GREENOUGH on Lieutenant Fulton's report.]

The failure to provide for their men was due principally to gross ignorance of duty and lack of appreciation of their responsibilities; but in some instances it was doubtless due to absolute indifference or stupidity. I was told that two companies went without supper—this proved true, but as shown herein was due to lack of knowledge and will hardly occur again. Such officers should be replaced by efficient ones—this is a matter for the State and for the companies interested to settle. Hereafter upon arrival a memorandum will be prepared giving more minute details.

First Lieut. Donald Frost, Third Regiment National Guard South Carolina, won the esteem and respect of all who came in contact with him, owing to his natural ability and determination to make the most of his opportunities during the encampment. Valuable now, he will become more so in the future.

INSTRUCTORS OF SUPPORTS.

[Capt. J. E. CUSACK, Twelfth Cavalry, U. S. Army.]

Having been in camp with the Third South Carolina Infantry at Chickamauga Park, Ga., during the summer of 1896, I desire to state that the discipline of this regiment at the present camp was superior in every respect over that of the preceding summer. The men took a keen interest in their work, were respectful and obedient at all times and seemed to appreciate the interest displayed by the regular officers detailed as instructors, and showed a commendable zeal to imbibe as much knowledge as possible in the short time allotted to the encampment.

The conditions prevailing during the forty-one hours these two companies were in camp at Battery Marshall, i. e., heat, sand, rain, and mosquitoes were sufficient to dishearten soldiers tried and true; yet as far as I could see these men were never disheartened; their interest never lagged, and they broke camp as buoyant in spirit and as keenly interested as when they first marched out to perform, to them, a novel as well as most arduous duty.

The officers and enlisted men of the Third South Carolina Infantry from the colonel down seemed to realize that they

were in camp for business and lost no opportunity to gain all the information possible. At the end of the encampment the improvement in the performance of guard duty and military courtesy was very noticeable.

[Capt. J. L. DE WITT, Twenty-ninth Infantry, U. S. Army.]

It is recommended that if these exercises are to be continued that a larger force be assigned as artillery supports, for I can not see how the rear of such works as are now completed at Fort Moultrie can be properly protected by less than 3,000 men. That the companies of the National Guard be required to send companies of greater strength to these exercises. The two companies assigned to this duty did not muster 80 men.

The companies were almost entirely lacking in any instruction connected with their duties as soldiers. They know very little of close-order drill and practically nothing of extended order. For any instruction to be imparted during these maneuvers the men should at least come fairly efficient in close-order drill. I noticed in one company that several of the enlisted men could hardly be called men, being, I believe, barely 16 years of age, although they told me they were 18 years of age. I was also told that a great many of the men were enrolled to come to the encampment and had had no previous military instruction. This condition of affairs should not be allowed to exist and still expect any benefit to be received from instruction at maneuver camps.

I must say that both officers and men were willing and energetic and seemed anxious to learn, but unless some little instruction is given at their home stations, at least in the school of the company, close order and in the guard manual, there is very little groundwork upon which to base the instruction that should be given at maneuvers.

COMMENTS OF MILITIA OFFICERS.

[Col. HENRY SCHACHTE, commanding Third Regiment, National Guard of South Carolina.]

Performed duties incident to office.

In exercises of this character for obvious reasons it is practically impossible to keep the regimental unit so long as we remain in the infantry, and it may be for the best interest

of the Government and perhaps for the State that a recommendation be made to convert this regiment into Coast Artillery. This matter will be carefully considered by me and at no late date a recommendation may be made.

It is recommended that at the next exercises held here this regiment be used as artillery reserves and another regiment of South Carolina infantry be sent to this district as artillery supports. Conditions at the camps of this regiment were generally good.

The men of our commands took great interest in the exercises and studies of the encampment, worked cheerfully and faithfully, evincing a desire to learn anything in the manning of the guns, etc., that was taught.

The companies in the artillery supports under the instructions of Captains Cusack and De Witt were thoroughly instructed in advance and rear guards putting up hasty entrenchments.

This report could not be completed without my acknowledging on behalf of myself and my officers and men our full appreciation of the uniform courtesy and attention on the part of every officer of the garrison and of the two officers detailed by the War Department to instruct the artillery supports.

The men I am satisfied have learned more on this encampment than in all the others we have attended, and this is attributable directly to the efficient instruction of the officers of the garrison.

[Comments on report of Col. HENRY SCHACHTE, Third Infantry, National Guard South Carolina, by District Commander Col. GREENOUGH.]

I concur in the advisability of having the exercises for this regiment held here next year and to use the regiment solely as artillery reserves. Also that the other infantry regiments of the State be sent here at the same time to act as infantry supports.

[Lieut. Col. SAMUEL M. WARD, Third Regiment, National Guard South Carolina.]

Recommends for future maneuvers—

That no officer or man be allowed to wear citizen's clothes during encampment.

That the period of hostilities be of shorter duration and that they be given constant work during that time so far as may be found practicable.

That two regiments be ordered in camp next year instead of one, as one is inadequate to furnish sufficient men for the proper performance of the exercises.

In conclusion, will state that we can not too highly praise and commend the army officers for the painstaking and efficient manner in which they have instructed the men of the National Guard. We have gained more general information at this encampment than at all of the former ones combined.

[Comments on report of Lieut. Col. SAMUEL M. WARD, Third Infantry, National Guard South Carolina, by District Commander Col. GREENOUGH.]

If some plan can not be devised for keeping up the strength of the National Guard, other than keeping the men satisfied and allowing them to come and go at will except when actually at drill and instruction, it will never be a very valuable asset.

However good troops have been evolved and men can be satisfied and given much liberty without endangering their efficiency. It is the going without reporting departure and return, the making of plans for pleasure before learning whether services will be needed and absenteeism in an insubordinate way that need a curb. During the preliminary period a large pass list can be permitted, but men who have been up all night are valueless during the day. Soldiers are needed, not boys. Every reasonable pass or furlough was granted which came to my office. If the men suffered, the inexperience of their own officers was the cause.

Citizen clothing should not be in camp or worn. This was not allowed, but a number brought it, while some were not equipped properly and compelled to wear it.

That guard duty was not strict and effective was due to the gross ignorance of many and to the indiscipline usual in green-troops. It was a matter of satisfaction that there was an awakening and a decided improvement.

Home work in such details would be of service. Care in guard duty depends largely upon the vigilance and discipline of the officers and noncommissioned officers in charge of guards.

It would be preferable, both on account of weather and of gunnery school, to have the encampment in May or June at the close of the period of outdoor instruction and after the examinations.

[Maj. A. J. BUIST, surgeon, Third Infantry, National Guard South Carolina.]

Appointed chief surgeon of entire camp.

The sanitation of the camp has on the whole been most excellent, such defects as were noted by the sanitary inspector being promptly reported to the company commanders and usually speedily remedied by them.

Especially noticeable was the advance made in the disposition of excreta, the incinerators being a great improvement over the latrines which have heretofore been used at the encampments of this regiment.

Much improvement was noticed in the cleanliness of the kitchens, mess tents, and company street as compared with the encampment at Chickamauga Park.

One of the greatest sources of instruction as far as the medical department was concerned has been the intimate association of the surgeon of the U. S. Army with those of the militia and of the regular hospital corps men with those enlisted in the State organization. From them most valuable information has been obtained and knowledge acquired with ease which would have required much time and inconvenience to acquire from any other source.

[Comments on report of Maj. A. J. BUIST, surgeon, Third Infantry, National Guard South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

I concur in appreciation of value of McCall incinerators; also of complete water supply.

[Maj. JULIUS E. COGSWELL, First Battalion, Third Infantry, National Guard South Carolina.]

During the encampment I was assigned to the duty of assistant fire commander and was on this duty during the entire exercises. My staff, Lieutenants McIver and Schachte, performed at various times the duties of watch and range officers at F' station, and as range observers on the water.

The method adopted here of appointing officers and men of the militia as understudies of the Regulars has proved itself admirable. I recommend its continuance and even an exten-

sion of the idea to the Staff officer—having for example the battalion adjutant and quartermaster detailed as assistants to post adjutant and quartermaster.

In connection with the formation of the camp I was particularly impressed with the good results as to discipline, military courtesy, etc., derived from the example of the Regulars who were necessarily intermingled with the militia because of the alternating of regular and militia company streets.

In conclusion, I think that these exercises have been of great benefit to the militia and should be continued. Officers and men were interested and pleased. I have not heard a word of dissatisfaction nor a single complaint of overwork. As long as the militia are kept occupied and feel that they are accomplishing something they will not complain.

I take the liberty of expressing my gratification at finding the officers of the post so considerate and painstaking in the instruction of the militia. Without exception I found every officer efficient, courteous, and anxious to help.

[Maj. E. W. HASELDEN, commanding Second Battalion, Third Infantry, National Guard of South Carolina.]

The instruction given by Captain De Witt and Captain Cusack, U. S. Army, was excellent, and I can not praise too highly these officers for their valuable instruction to both officers and enlisted men; they were painstaking and did everything in their power to make the maneuvers a success.

[Comments on report of Maj. E. W. HASELDEN, Second Battalion, Third Infantry, National Guard of South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

I agree with need for more supporting troops at Battery Marshall. Day attacks were intended but weather and lack of boats rendered them impracticable. It is hoped to have better boat service supplemented by Naval Reserve another year.

[Capt. J. SHAPTER CALDWELL, adjutant, Third Regiment, National Guard of South Carolina.]

Greatest difficulty was in getting the companies to turn in promptly their morning reports. After two or three days this difficulty ceased, the first sergeants having learned how to make them out.

Suggests: That if regiment is to be sent here yearly it be changed into a coast artillery organization of separate companies, with such field and staff officers as may be deemed necessary. This plan has been most successful in Massachusetts, where the old First Regiment has been changed into a corps of Coast Artillery.

I would further suggest that the staff officers of this regiment in future exercises be associated with the district staff as assistants. This would be particularly beneficial to the quartermasters and commissaries, who would learn the many intricacies of these departments.

Expresses appreciation of courtesies and assistance of officers of post. That the troops at Batteries Gadsden and Thompson (Captain Mitchell) have in consequence benefited more by this encampment than by any previous one.

[Comments on report of Capt. J. S. CALDWELL, Third Infantry, National Guard of South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

I recommend issue to or purchase by national guard companies of Officers' Manual (for use of subalterns) by Lieut. Col. J. A. Moss.

[Capt. D. B. BLACK, commissary, Third Regiment, National Guard South Carolina.]

Issued subsistence, aided by the commissary officers, to the regiment.

My work during this encampment has been very instructive to me. I have, by the assistance of Commissary-Sergeant McGeegan, Private Davis, and others connected with this Department, found my work very pleasant as well as profitable; they have been ever willing to aid and instruct me in the work I had to do. The method of issuing subsistence at this camp, in my opinion, would be very hard to improve on.

[Capt. A. W. BROWNING, assistant surgeon, Third Infantry, National Guard South Carolina.]

The sanitary condition of the camp, as far as was noted by me, far excelled that of any encampment I have ever attended—those of the past four years.

The incinerators of Dr. J. H. McCall, of Nashville, Tenn., were a great improvement over the latrines used at Chickamauga.

The hospital corps received instruction daily in the litter drill and uses of first-aid package and first aid to the injured.

It affords me pleasure to say that, from the excellent arrangement, location, and equipment of the field hospital and the discipline required, my military erudition has been greatly informed.

[Capt. T. T. HYDE, commanding Company A, Third Infantry, National Guard South Carolina.]

I believe that there should be a recognition of the fact that these encampments give occasion for the only vacation that many of the enlisted men ever enjoy. Hence to secure the attendance of a satisfactory proportion of our men we must have some inducement to offer them beyond the promise of instruction in military matters only. I think the work imposed on the men this year was very reasonable and not at all too heavy, but I believe that in future the period of work and recreation should be very definitely marked. I think that certain hours every day should be prescribed, and sufficient hours, too, for hard work, but when such has been done, then a sufficient period for recreation should be specified. The long time in which men are some times held in camp awaiting orders is calculated to make militiamen restive and unhappy; while if they are working when required to be in camp, and then every day have opportunity for indulging themselves, it would add much to the content and attendance of larger numbers. In short, I advise work and hard work, too, for certain hours, and then certain recognized hours each day for freedom.

The instruction received from the army officers has been helpful and the benefit to our officers and men very great. Everything within reason has been done to make our intercourse with the Regular Army agreeable, and the tendency has been to make future encampments more popular.

[Comments on report of Capt. T. T. HYDE, Company A, Third Infantry, National Guard South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

Every liberty applied for was granted. Another year the experience gained by them this year will lead to prompt applications and the planning of more adequate amusement features. The period of encampment should not be the out-

ing allowed yearly from business, but regarded as a very serious matter. False habits, teaching, and methods of thought would be apt to result from such a system.

Plans for amusement, properly and seasonably submitted, can usually be arranged. I am no believer in all work and no play for the average man.

[Capt. W. L. LANNEAU, commanding Company B, Third Infantry, National Guard South Carolina.]

At first I was not in favor of encampment, partly because satisfied it would be difficult to get men to be present at our encampment so near home, partly because I did not know the advisability of putting the regular and militia men so close together.

I found less trouble as to first objection but did have a great deal of trouble with employers, who do not realize the necessity of National Guards. I have found myself altogether wrong as to my second objection. My men were taught a great deal by the regular soldiers, who were of great assistance in every way.

Feels that company has received a great benefit from this encampment which thinks will be lasting.

Recommends that if possible South Carolina National Guard be sent to a more distant post, as this encampment is the only holiday the men have, hence they enjoy getting from home.

Expresses appreciation of the regular officers he was under, they being most courteous and giving very intelligent and welcome instructions.

[Comments on report of Capt. W. L. LANNEAU, Company B, Third Infantry, National Guard South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

This military service, while a privilege to be sought by every able-bodied patriotic citizen, should be entirely apart from the usual reasonable holiday privileges granted to employees.

[Capt. JOSEPH M. WALSH, commanding Company C, Third Infantry, National Guard South Carolina.]

Regards encampment as very successful. Much instruction at guns. Very good feeling toward coast artillery service developed.

Sanitary arrangements most perfect has ever seen in over twenty-two years' experience in National Guard. Appreciates friendly disposition shown by all regular officers and their efforts to assist. Also commends the regular noncommissioned officers and privates for similar help.

[Capt. JOHN C. D. SCHRODER, commanding Company D, Third Infantry, National Guard South Carolina.]

Maneuvers eminently satisfactory from every point of view. Instruction as thorough and painstaking as time permitted. Although more or less superficial, information gained has served to give National Guard a fair insight into coast defense. National Guard was greatly interested and attentive. Discipline, noticeably deficient before, was on high order of efficiency and reflected much credit on both services.

A clear demonstration of fact that National Guard, South Carolina, can be relied upon to afford a valuable adjunct for coast defense.

Acknowledges with thanks and appreciation uniform courteous treatment at hands of all officers.

[Comments on report of Capt. J. C. D. SCHRODER, Company D, Third Infantry, National Guard South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

Great credit is due the National Guard for the improvement in the short time, but to obtain the efficiency desired will require much work, not only in future camps but at the home drill grounds and armories in the periods between.

[Capt. H. B. SPRINGS, commanding Company F, Third Infantry, National Guard South Carolina.]

I consider that the instruction derived from the assignment of this work has been of valuable benefit to the company.

[Capt. E. L. FISHBURNE, commanding Company K, Third Infantry, National Guard South Carolina.]

The lack of men, in my opinion, has been the only defect in the plan of the encampment.

[Comments on report of Capt. E. L. FISHBURNE, commanding Company K, Third Infantry, National Guard South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

The lack of men referred to is a crying evil due, I think, to the State management and lack of sympathy with the militia. It is hoped that in this respect there has been an

awakening and that many friends have been made for the militia who will urge improvements and changes in State laws in regard to militia.

[First Lieut. E. C. REGISTER, battalion adjutant, Second Battalion, Third Infantry, National Guard South Carolina.]

This work was entirely new to the men but very instructive and of vital importance.

[Comments on report of First Lieut. E. C. REGISTER, battalion adjutant, Second Battalion, Third Infantry, National Guard South Carolina, by District Commander Col. G. G. GREENOUGH, Coast Artillery Corps.]

With a longer encampment not taken from the "outing period" of the militiamen I should concur in the recommendation as to the ceremonial features and infantry drills, but under existing conditions feel that nearly all of such work pertains to the home armories and drill grounds. The infantry foundation should be obtained there.

[First Lieut. GEO. F. WILSON, assistant surgeon, Third Infantry, National Guard of South Carolina.]

The sanitation of this camp has been excellent; that the incinerators of Dr. J. H. McCall are far superior to the latrines used at Chickamauga, Ga., or Columbia, S. C. Suggests that privates, guards, and officers be equipped with mosquito-bars and hoods. That an armory or quarters in an armory be furnished the Hospital Corps in order that they be properly drilled and organized prior to encampment.

[First Lieut. DONALD MCKAY FROST, Company B, Third Infantry, National Guard of South Carolina.]

Encampment generally regarded as the most successful so far. Men enjoyed themselves and officers and men alike received useful instructions. Is especially grateful to the officers of regiment because of the difficulty experienced in getting men to attend.

This largely due to many unpleasantnesses during the camp at Chickamauga and that men are loath to take their only holiday on Sullivans Island so near home. Also doubt as to associating with regular privates and noncommissioned officers. Glad to say that all these difficulties were overcome in a way most satisfactory to those interested in the development of the militia.

In order that some idea may be given of the difficulties encountered by the militia in this locality and that the Department of War may assist us in remedying these difficulties I take the liberty of setting them forth at some length.

In the first place there is at present little local sentiment in favor of the militia in Charleston. This is due in a large measure to the fact that in times of peace the necessity for a well-equipped and well-trained militia is not very evident. Again, a number of our people are conscientiously opposed to the centralization of power in the United States Government, which they believe to be fostered by the "Dick law." An example of this feeling was shown this year when the manager of one of the largest manufacturing plants in this city, who would probably be the first to need the services of the militia, refused to allow three of his employees to take part in the encampment because he was opposed to the "Dick law." Local public sentiment must, of course, be improved by the local militia, and while we can not ask for assistance in this regard I nevertheless desire to call attention to it as explaining our shortcomings.

It gives me great pleasure to state that the fear among the local officers that friction would exist between the regular soldiers and the militia has been completely disproved by this encampment. Not only did the regular privates and noncommissioned officers show every courtesy to the members of the militia companies but at times put themselves out to make the surroundings of the militia attractive and agreeable. In this regard I can not praise too highly the consideration and kindness shown by the noncommissioned officers and privates of the Third and Ninety-ninth Companies of the Coast Artillery. The kindest spirit was engendered between the two branches.

The experiment of having the militia companies encamped by the regulars and having the officers of the militia companies in close contact with the regular officers was very beneficial. By this means the militia officers and men had the opportunity of learning their duties by practical application rather than by theory or through the medium of orders which they often do not understand.

In conclusion let me express the appreciation of all the officers and men encamped at Battery Capron for the cour-

tesies extended by Captain McMillan, the battery commander, and Captain Hubbard, in command of the Ninety-ninth Company. These gentlemen did everything in their power not only to assist and instruct but also to aid us in the local problems which belong to the militia and not to the Regular Army. They could not have displayed greater courtesy, consideration, or kindness, and I must believe that the success of the encampment, as far as the companies associated with them are concerned, is largely due to their efforts.

[First Lieut. H. L. M. KUCK, Company D, Third Infantry, National Guard of South Carolina.]

Altogether a good plan to bring the militia to Fort Moultrie and hopes they will be sent again. The encampment very successful.

[First Lieut. R. BOYD COLE, Company E, Third Infantry, National Guard of South Carolina.]

Company detailed as supports. Instructed in advance and rear guard, outpost and patrolling duty, hasty entrenching, and skirmish drill, firing, etc.

These drills very beneficial to all. Sure that every man present acquired more knowledge of military affairs than at any previous encampment.

[First Lieut. HARTWELL MEYER, commanding Company H, Third Infantry, National Guard of South Carolina.]

Camp of instructions seems to have been most admirably managed and militia received instructions readily from regulars, who were very kind and attentive.

Handling of guns and methods of coast defense, especially outpost guarding, most interesting as well as profitable.

[First Lieut. WILLIAM M. RHODES, commanding Company I, Third Infantry, National Guard South Carolina.]

The exercises have proved quite profitable to the men of this company, as the methods of instruction were easily comprehensible, yet thorough.

[Second Lieut. J. E. SCHACHTE, battalion quartermaster and commissary, First Battalion, Third Infantry, National Guard South Carolina.]

For the first instruction in coast defense we find the scheme as mapped out in General Orders, No. 2, most thorough and I think could not be improved upon. It has given the

officers a chance to become familiar with the various instruments of the stations, and the noncommissioned officers and men have been given practical instruction in handling the guns, which I think the main feature of the encampment, for when the time for action arrives the men must be thoroughly familiar with the guns.

We found the officers courteous and always willing to answer any and all questions put to them in the most painstaking and thorough manner.

I would respectfully suggest the assignment of the quartermaster and commissary to the post quartermaster to learn the workings of that department.

[Second Lieut. L. D. LESEMANN, Company D, Third Infantry, National Guard South Carolina.]

Feels that entire regiment will be benefited: First, because of knowledge gained; second, by observation of the discipline exacted of regular troops, which can hardly expect to equal in National Guard for well-known reasons, but believes that the experience will aid national guard officers in developing a higher state of discipline than heretofore.

Maneuvers very instructive and interesting and while work sometimes trying to the men on account of the heat they were not overtaxed.

STATE OF GEORGIA.

Artillery District of Savannah.

[Date of exercises: July 10 to 25.]

COMMENTS OF REGULAR OFFICERS.

[Col. R. H. PATTERSON, commanding Artillery District of Savannah, Fort Screven, Ga.]

The progress made was very gratifying as regards drill, but sentries on outpost and interior lines did not seem to grasp the importance of strict obedience to orders as to whom had the right to pass the outposts and through the interior lines.

The reserves applied themselves to their work in a very creditable manner, and being mostly educated men grasped the details very quickly and efficiently.

The loyal support from all my officers, shorthanded as we were, as well as that from the officers and men of the reserves and supports, and cordial relations which marked this encampment has created an interest in Fort Screven and its defense which I believe will last.

Whether we can depend upon the First Battalion, Heavy Artillery, National Guard of Georgia, to return next year is problematical, as the time taken makes the men lose their vacation, but I have proposed to the commanding officer that we make some arrangement by which detachments can visit post during the year, and I would afford them all the facilities possible to keep up the interest developed in the work. As far as the Fourth Infantry are concerned I know they are anxious to return in the future and give the Naval Reserves or any other body of men designated as the enemy a chance to try and pass through their lines again.

I would recommend that these encampments for this locality be held sometime in May. October and November are busy months in the cotton belt, and any time after June the first we are liable to extreme heat and the pest of mosquitoes and sandflies.

[First Lieut. W. TIDBALL, Coast Artillery Corps, district adjutant.]

Staff of battalion of heavy artillery worked intelligently on their reports.

Recommends annual exercises of ten-day periods.

[Capt. HARRISON HALL, Coast Artillery Corps, artillery district engineer, Fort Screven, Ga.]

Lectures on general principles of mine equipment and communication.

Intelligent interest shown in regard to communication, signal, and mine work.

[Capt. S. S. O'CONNOR, Coast Artillery Corps, commanding Seventy-second Company, Coast Artillery Corps, Fort Screven, Ga.]

The Seventy-second Company and Companies A and B, National Guard of Georgia (heavy artillery), were linked for service at Battery Brumby.

No disposition on part of National Guard to shirk work. No serious breach of discipline. Special attention is called to excellent work of National Guard. Exhibited ability of superior order and considered exercise a great success.

[Comments of district commander, Colonel PATTERSON, on Captain O'Connor's report.]

The progress of these two companies, A and B, was as marked as the rest of this battalion and the cordial relations existing during camp will add to their willingness to participate in another such form of exercises. During the two days at attack and defense I assigned Company A to No. 1 Brumby and Company B to No. 4 Brumby, feeling sure they were capable, with a little supervision, to acquit themselves creditably, which they did without accident.

[Capt. JOHN MCBRIDE, Jr., Coast Artillery Corps, commanding Seventy-fourth Company, Coast Artillery Corps, Fort Screven, Ga.]

Company D, Heavy Artillery, National Guard of Georgia, linked with Seventy-fourth Company at Battery Backus.

Noncommissioned officers Seventy-fourth Company took great pains to explain all duties connected with the drill, use of sights, etc.

Excellent work done by Company D at subcaliber practice, general strict attention to all instructions and were apt in learning. Attribute this to superior intelligence of men of Company D. Believe that all derived great benefit.

[Comments of district commander, Colonel PATTERSON, on Captain McBride's report.]

The instruction given to Company D, First Battalion, Heavy Artillery, was proven by the results obtained, and Company D was by me assigned to 14-pounders for the two days' attack and defense and served the guns intelligently and without accident of any nature.

[Capt. G. L. HICKS, Jr., Coast Artillery Corps, commanding One hundred and sixteenth Company, Coast Artillery Corps, Fort Screven, Ga.]

Company C, First Battalion, Heavy Artillery, National Guard of Georgia, was linked with the One hundred and sixteenth Company and camped in line with it.

Police and sanitation of camp excellent. Absence of flies due likely to use of McCall incinerator and removal of garbage. Interest and intelligence of National Guard was gratifying, deserving praise. Excellent subcaliber practice and

results of handling black powder. Exercises should be held in spring or fall. Troubled by mosquitoes and sand flies. Great benefit derived from exercises.

[Comments of district commander, Colonel PATTERSON, on Captain Hicks's report.]

This company (Company C, First Battalion, Heavy Artillery) was as energetic and enthusiastic as the others and made a good record at subcaliber practice. Same cordial relations between the One hundred and sixteenth company, Coast Artillery Corps, and Company C, Heavy Artillery, National Guards of Georgia, as prevailed in all the linked camps.

[First Lieut. W. C. BAKER, Coast Artillery Corps, range officer, Battery Brumby, Fort Screven, Ga.]

Believe that material good would develop if range-finding devices were supplied National Guard organizations in their armory. All took advantage of opportunity to familiarize themselves.

[First Lieut. J. A. CLARK, Medical Department, U. S. Army, Fort Screven, Ga.]

Food sufficient in quality, field ranges used. Health of command exceptionally good.

INSTRUCTORS OF SUPPORTS.

[Capt. B. C. MORSE, Twenty-ninth Infantry, U. S. Army, Fort Screven, Ga.]

Personal equipment of men not as complete as should be.

Officers and men apt, took kindly to instruction. Many conveniences in camp, good water, dry grounds, electric lights, abundant tentage, cots, and telephones. All learned valuable lessons in drills, discipline, sanitation, etc., and Government and State received value for money expended.

COMMENTS OF MILITIA OFFICERS.

[Lieut. Col. W. M. WILDER, commanding Fourth Regiment of Infantry, National Guard of Georgia, Fort Screven, Ga.]

Uniforms were not sufficient and were of old issue. Each man should have 3 chambray shirts, 2 khaki outfits, and extra pair khaki breeches and shoes.

Camp site well selected.

Troops insufficient to work out project successfully.

Opinion that Fourth Infantry benefited by exercises and that time and money spent were well invested. Recommend that a company of regular infantry be encamped with National Guard. Next encampment here should have two battalions and each company have 60 men.

[Maj. WILLIAM B. STEPHENS, commanding First Battalion Heavy Artillery, National Guard Georgia, Fort Screven, Ga.]

The conditions under which the command went into camp on July 10, 1907, were very trying to the men as well as to their employers. Owing to the extreme heat and to the millions of mosquitoes, sand flies, and other very disagreeable insects with which they had to contend and against which nets were but scant protection it was extremely difficult for anyone to remain in a happy state of mind. Furthermore, business conditions were such in Savannah at that time as that it became necessary for probably half of the battalion to come to Savannah each day and devote their attention to their respective professional or business duties. To perform civil and military duties during the day and fight mosquitoes and sand flies during the night during the hottest season of our summer is a task which no man cares to undertake except when necessary, and are conditions which should be avoided.

Owing to the encampment being ordered at a time of the year when one-half of the employees were getting their vacations while the other half were doing double duty we found it impossible in numerous cases for the employers to excuse from service the remaining employees and it became necessary for us to arrange to permit such employees to come to Savannah each day to attend to their civil duties.

In this connection I desire to state that with few exceptions the employers cheerfully cooperated with the command in its effort to successfully perform this tour of duty and that, too, at great sacrifices. In several cases offices were practically closed during the period of encampment. A few employers were so wanting in patriotism as to threaten to discharge from their service employees who might attend the camp and of course these men were excused by me, feeling that I was not justified in jeopardizing their livelihood.

All employers were much dissatisfied that the encampment should have been held in July and were more dissatisfied that it should have been ordered for as long a period as two weeks.

I earnestly recommend and respectfully urge that my command be not ordered into a similar encampment for a period exceeding eight or nine days, including two Sundays, and that the time of such encampment be between the 10th and 31st of May.

Several very interesting and instructive lectures on various subjects pertaining to the work were delivered by army officers to the officers of my command, with the result that we gained much valuable information that would otherwise have required the study of many text-books and years of experience on our part to acquire. The commanding officer and every other officer in attendance upon the camp cheerfully and painstakingly sought in every possible way to render this tour of duty pleasant and profitable to my entire command, requiring at times I am quite sure that degree of patience and forbearance which can seldom be found elsewhere than with soldiers of the standard of United States Army officers. The enlisted men, noncommissioned officers, and privates were earnest and willing in their efforts to teach members of my command every detail of the work at hand and to them we are greatly indebted. I feel safe in saying that the members of my command, officers and men, availed themselves of every opportunity to gain information and to attain that degree of proficiency in coast artillery service which will enable them to be of assistance to the Government in time of need. As to what was accomplished I will respectfully refer you to the reports of the army officers who were the immediate instructors of the respective companies.

While it may be possible for the command to go to Fort Screven on one or two holidays during the year, spending a few hours there on each occasion, I realize that it will be impossible to take the men into camp more than one time each year and then for a period not exceeding eight or nine days, including two Sundays, and therefore feel that it is of great importance that we be supplied with some means of study and work in heavy gunnery which can be used in

our arsenal in ordinary course of drill. If we could be provided with a plotting board for direct firing guns and another for mortar and range and deflection boards they would be of great assistance to us in our preparation for work at the fort. In addition to these if it were possible for us to have a carriage and some discarded gun which could be set up in the square in front of our arsenal and upon which regular drills could be had our opportunities for preparation in heavy gun work would be greatly enhanced. Any and all books, pamphlets, or other literature issued by the War or Ordnance departments pertaining to guns at Fort Screven, should be supplied to us that the companies may fully inform themselves as to the guns to which they are respectively assigned.

In behalf of the Savannah Volunteer Guards and speaking for every member thereof I wish to express our deepest appreciation and gratitude for the interest manifested in us, for the able, painstaking, and tireless efforts to instruct us, and for the kindly and courteous treatment always accorded us by the entire garrison, from the commanding officer to the latest recruit.

[Capt. J. G. JARRELL, surgeon, First Battalion Heavy Artillery, National Guard of Georgia, Fort Screven, Ga.]

The artesian wells at Fort Screven gave a bountiful supply of pure water for all purposes.

The food of the men was good in quality, properly cooked and served.

I would respectfully recommend subsequent encampments at Fort Screven be held either during the months of April and May or October in order to avoid mosquitos and the extreme heat of summer.

[Capt. J. A. HUTTON, commanding Company A, First Battalion Heavy Artillery, National Guard of Georgia, Fort Screven, Ga.]

All hands picked up drill in surprising manner.

Gun No. 1 assigned to Company A; 20 rounds small-arms ammunition issued.

Camp thoroughly policed. Health of command better than could be expected. Vague idea of duty to be performed took away enthusiasm to attend exercises; this was reversed by

cordial and efficient treatment by regular garrison. Recommend April and May for exercises. Expresses appreciation for courtesies received.

[Capt. E. F. LONEE, Jr., commanding Company B, First Battalion Heavy Artillery, National Guard of Georgia, Fort Screven, Ga.]

Flattering tribute to officers of the Seventy-second Company, Coast Artillery Corps, for attention given during exercises. Hope that War Department will order similar exercises. Time should be changed to April or May.

[Remarks of district commander, Col. PATTERSON.]

It is believed that the cordial relations established between the regular garrison and the militia has done away with any disinclination on their part to participate in future exercises and that the instruction imparted will be a great incentive to future progress.

[Capt. R. J. TRAVIS, commanding Company C, First Battalion Heavy Artillery, National Guard of Georgia, Fort Screven, Ga.]

Daily instruction: Competent instructions at Battery Habersham by officers of One hundred and sixteenth Company; 2 mortars manned; gun mounting and one parade; subcaliber practice; instructions in position-finding service.

Period of holding exercises should be changed. Recommends a gunners' examination for the National Guard. General courteous treatment by officers of regular establishment.

[Capt. WILLIAM H. ROBERTSON, commanding Company D, First Battalion Heavy Artillery, National Guard of Georgia, Fort Screven, Ga.]

I believe the encampment was a source of much interest and knowledge to the officers and men of my company and they showed themselves apt scholars under the teaching and direction of the regular officers and men in learning the construction, mechanism, and handling of the guns to which we were assigned.

We were linked with the Seventy-fourth Company and were assigned with them to the 4.7-inch Armstrong guns, Battery Backus, and our men having showed an interest and ability to handle these guns and having become proficient in their use we were then assigned and given entire

charge of the 15-pounders, Battery Gantt, which battery we manned and handled entirely during the war maneuvers. The drill for the 15-pounders we learned ourselves.

It was a source of much gratification to feel that the commander of the post thought my company capable of handling a battery without the assistance of the Regulars.

My company made a record at target practice which I thought was good.

It occurs to me that it would be very beneficial if it could be so arranged that our battalion could have some practice and instruction in heavy artillery work more often, making the tour of duty shorter, thereby making it possible for us to have better attendance upon encampments.

I desire to express the appreciation of Company D and myself to Col. R. H. Patterson, commander of the post; Capt. John McBride, commanding officer of the Seventy-fourth, and to the enlisted men of the garrison for the interest they took in assisting us to become acquainted with the mechanism and handling of the guns which were assigned to us.

[First Lieut. S. T. MOZEN, battalion adjutant, Fourth Infantry, National Guard of Georgia, adjutant provisional battalion, Fort Screven, Ga.]

Arrangements for transportation made at Adjutant-General's Office of National Guard of Georgia. Baggage strayed away in Savannah due to inadequate facilities of railroad. Some of the baggage did not reach Screven until 10.30 p. m., five and one-half hours after troops.

Camp site excellent with special arrangements as to running water, latrines, and incinerators.

Discipline satisfactory.

Intelligence and interest shown, good, beyond expectations. Benefits, many; drill in larger units than ordinarily falls to National Guard means a lot; close touch with regular troops. Camp should be held in April or May, climate not permitting of violent exercises in summer. Shoes not of variety best suited to camp. Government should supply same for National Guard. Camp should be held every year.

STATE OF ALABAMA.

Artillery District of Charleston.

[Date of exercises: July 5 to 15.]

[NOTE.—The defenses of Mobile Bay having been practically destroyed by the storm of September, 1906, it was impracticable to hold exercises in that locality. Upon application of the State authorities four companies of Alabama National Guard were designated for participation in the exercises of Charleston Harbor.]

COMMENTS OF ARTILLERY OFFICERS.

[Col. G. G. GREENOUGH, Coast Artillery Corps, commanding Artillery District of Charleston, Fort Moultrie, S. C.]

The Alabama militia field artillery came without proper equipment or preliminary training. Some had pistols; some were weaponless.

None of the militia had muster or pay rolls ready. They were informed, so they stated, upon applying to Department headquarters that all blanks, including muster rolls, would be issued to them here. General Orders, No. 99, War Department, current series, states very plainly that all rolls should be prepared before leaving home, and that the Paymaster-General's office in Washington would send in season therefor the blanks to the various organizations from his office.

Although the lectures took place as scheduled, there were too many absentees. To enable the officers to give undivided attention to the men at first, and also to bring all in contact at the earliest moment the commissioned officers of the militia and post met at supper at my quarters and were piloted therefrom to the gymnasium for the first lecture at the specified hour.

About 4.30 p. m. the First Artillery, Alabama National Guard, arrived at post, getting off in front of administration building. They came under command of Brig. Gen. Bibb Graves, adjutant-general (under General Orders, No. 2, Office Adjutant-General, State of Alabama, June 1, 1907), who reported upon arrival, waiving rank. There being no proper authority or apparent reason for overslaughting Major Westcott, I simply had the troops assigned as intended and telegraphed to War Department for status of General Graves

(vide papers appended). It was decided that he could not be mustered in or assigned to any duty, but could remain as a spectator.

The Alabama batteries came dismounted. Three were armed with pistols and the other was without arms of any sort. All had their haversacks, canteens, and other field equipment. Their appearance was slovenly and unkempt to a degree, so that they produced an unfavorable impression upon all. This not because of travel stains but because of lack of training and cohesion. Many of the men were too light for artillery work. However, many of these men were mechanics. Looked upon in the light of a body of recruits merely they were very satisfactory material for developing. Their baggage did not reach them promptly. Starting at 4 p. m. July 4 from Montgomery, Ala., they did not reach Charleston until 12.30, where further delays occurred.

The Alabama troops were assigned, Batteries A and B to Battery Jasper and Batteries C and D to rapid-fire guns.

Although mustered the day after arrival the rolls were not available until July 11 and 12, 1907, because the blanks had not been supplied as required by page 6, General Order 99, War Department, current series, and did not reach post until 11 a. m. July 9. Consequently the payment had to be made during a rain storm Sunday afternoon, July 14.

During this encampment to instruct 14 companies of raw militia, to say nothing of an equally raw field and staff, there were but 8 company officers, one of whom was also district quartermaster with a great deal of constructing work. Six of these officers had, in addition, companies and batteries to look after.

In conclusion I will state that throughout the recent encampment I was greatly pleased to note the unflagging interest of the visiting troops and the readiness with which a large percentage familiarized themselves with the drill. Also the great improvement shown by the end of the encampment in attention to minor details, courtesy, promptness at formations, etc. All of which confirms me in the belief that a continuation of such joint encampments will lead to a great improvement in the National Guard as well as have a broadening effect upon the Regular Army itself, which latter had gained in experience in dealing with such troops so that at

another time much improvement should appear in the handling of the instruction, and in avoiding the contretemps of this encampment by earlier and more complete preparations.

I feel that the National Guard of Alabama have carried away with them much that has caused them to think deeply and to induce them to greater efforts to perfect themselves in soldierly qualities, in bearing, tidiness, outward and real respect to and for their superiors in military rank, and to take such steps as will win them a stronger title to the respect, esteem, and support of their neighbors and the public at large.

While having endeavored candidly to note their present weaknesses and shortcomings, nevertheless they left carrying with them our very real respect and cordial good will as a result of their interest and earnest work.

The next encampment will show what the actual benefit of this one has been. I hope to see far greater snap, precision, knowledge of paper work and drills, consequently better target results.

For the best results, however, steps should be taken to reorganize the artillery reserve regiments as coast artillery in accordance with our organization.

[Comments of the district commander, Colonel GREENOUGH, on First Battalion, Artillery, Alabama National Guard.]

The batteries of this battalion were willing, but displayed no proper knowledge of even minor matters of drill and instruction. They brought a very fair amount of good will, but while improved to a marked extent by the encampment were slipshod in their methods to the end. They must, if they hope to make good soldiers, pay attention to routine details and study drill regulations and smartness of bearing while at their home stations. I talked freely with many officers and men upon the subject, urging them to help in developing corps pride day by day at home.

Company commanders retained command of their companies and in matters of administration the field and staff. To have attempted more than was done with the field and staff would have been difficult.

The same organizations should be sent to the same stations, batteries, and duties for the first two years at least, after-

wards to similar duties and guns, but to other stations so as to have variety and to learn the country and routes.

It is to be noted that Major Westcott alone indicates any wish for or care as to having yearly encampments. Yet I know that such is the general understanding and hope.

All of these troops are very raw, officers and men alike. They seem as a body greatly interested, and as a rule tried hard so that great improvement resulted. I told them plainly that to obtain satisfactory results they must work systematically at home and come to us well grounded in school of soldier, etiquette, guard duty, etc., and as far as possible, paper work.

[Capt. T. F. DWYER, Coast Artillery Corps, commanding Sixteenth Company, Coast Artillery Corps, Fort Moultrie, S. C.]

The usual defects as to discipline were observed in Batteries C and D, First Artillery, Alabama National Guard, especially in the former. Both batteries acquired considerable facility in their duties at the guns, especially the enlisted men, Battery D being especially noticeable in this respect. First Lieutenant Dorrance, Battery D, showed marked ability in learning his duties, was very thorough in his work, and showed great energy in instructing his men and accomplished good results generally. First Lieutenant Longorier, Battery C, did good work, learned his duties to a considerably thorough extent, and did well in imparting instruction to his men. The other officers of this battery showed more or less indifference to the work and absented themselves considerably from the drills and exercises.

[First Lieut. D. C. McDONALD, Coast Artillery Corps, Thirty-sixth Company, Coast Artillery Corps.]

Refers to Alabama troops as all quiet and orderly and well behaved. Manifested deep interest and anxious to learn. By end of encampment showed great improvement. Seemed a desire to be at the guns all the time and count as lost that time taken up by infantry work.

COMMENTS OF MILITIA OFFICERS.

[Maj. S. T. WESCOTT, commanding First Battalion, Artillery, Alabama National Guard.]

Suggests that in order to secure as early as possible an efficient body of men to aid coast defenses the same organizations from each State be assigned to the same duties and exercises annually.

[Capt. A. B. BUTLER, battalion quartermaster, First Artillery, Alabama National Guard.]

Our stay at Fort Moultrie has been pleasant and profitable to all enlisted men as well as the officers, the enlisted men, especially, having profited by the discipline of the men of the regular service.

[Capt. F. M. MADDOX, battalion commissary, First Artillery, Alabama National Guard.]

Each battery's rations were placed in their streets as designated by the acting quartermaster within fifty minutes after reporting at the post. The second issue of five days' rations was made on July 10.

The rations furnished while here were of the best, not having a single complaint, and I desire to say that I have received the most courteous treatment from the officers of the quartermaster's department and we are indebted to them for their patience and painstaking manner upon each and every occasion when we made a request.

[Capt. Y. W. PRINGLE, commanding Battery A, First Artillery, Alabama National Guard.]

I would recommend that this battery be turned into a coast artillery company.

All have been most courteously treated by officers and men of garrison. Especially indebted to Captain Johnston and Seventy-eighth Company, Coast Artillery Corps, for patient and painstaking instruction and encouragement.

[Capt. GEORGE H. TODD, Jr., commanding Battery B, First Artillery, Alabama National Guard.]

Courteously treated by all. Regulars willing and ready at any and all times to render any assistance or instruction requested.

[Capt. I. N. EDDY, commanding Battery C, First Artillery, Alabama National Guard.]

Three drills per day to July 13. Thinks instructions received will prove very beneficial and appreciate interest taken by regulars.

[Capt. J. Q. SMITH, commanding Battery D, First Artillery, Alabama National Guard.]

Sanitary condition all that could be desired.

Discipline in every way satisfactory, every day showed improvement.

Feels that encampment has been exceedingly beneficial. Largely due to officers of the "service" who were willing to explain and to answer questions. This applies also to the regular enlisted men.

Was surprised at good feeling and bearing existing between regulars and militia. As result, militia have improved and a better understanding prevails.

[First Lieut. EDWARD K. NELSON, Battery A, First Artillery, Alabama National Guard.]

We have received most courteous treatment from officers and enlisted men of regular service, and the careful instruction and hearty encouragement given us by Captain Johnston and men of the Seventy-eighth Company are especially appreciated.

[First Lieut. JOSEPH F. REMBERT, Battery B, First Artillery, Alabama National Guard.]

Experience had of great benefit. Expresses appreciation of courtesies extended by Captain Johnston and Lieutenant McDonald and other officers and thanks them.

[First Lieut. W. F. LONGCRIER, Battery C, First Artillery, Alabama National Guard.]

Thinks drills have been of great benefit.

[First Lieut. L. S. DORRANCE, Battery D, First Artillery, Alabama National Guard.]

States that experience at Fort Moultrie was very valuable and instructions to the officers and men of battery will be useful at home with field guns.

Advice given by officers of regular service on other subjects will prove beneficial.

This association of State troops and regulars has by latter's example brought about better discipline.

[Second Lieut. HUGH SEWELL, Battery B, First Artillery, Alabama National Guard.]

Thanks Captain Moses and other officers many times for consideration shown to all.

[Second Lieut. KIRK A. PHILEN, Battery C, First Artillery, Alabama National Guard.]

"We" think instructions received will prove very beneficial to this battery and appreciate interest taken by garrison.

[Second Lieut. J. D. CARLISLE, Battery D, First Artillery, Alabama National Guard.]

Was surprised at readiness of militia in learning their duties.

Thanks Captain Moses for courtesy and "willingness" extended men at primary station. Was agreeably surprised at way both militia and regulars conducted themselves during maneuvers.

Sanitary condition excellent. States mores successful than maneuvers at Manassas, as each man has benefited by individual instructions.

STATE OF FLORIDA.

Artillery District of Tampa.

[Date of exercises: October 19 to 29, 1907.]

COMMENTS OF REGULAR OFFICERS.

[Maj. C. H. HUNTER, Coast Artillery Corps, commanding artillery district of Tampa, Fort De Soto, Fla.]

At each post some pork and beans and coffee from the supply for the militia were prepared by the artillery company's cooks so as to have a hot meal awaiting the militia immediately upon their arrival. They were very hungry and this attention was appreciated.

The militia officers familiarized themselves with the sanitary order and the district order of exercises. There was much interest in the batteries and the artillery were there to explain everything.

The supports were thoroughly instructed. I saw little of the Fort Dade supports, but the instruction here was admirable. Captain Morse is an excellent instructor with an instinctive knowledge of what was needed and the improvement in the two companies under his charge was remarkable. He was tireless in giving and the militia in receiving instructions in ceremonies, outpost duties, intrenchments, the use of field telephones, etc., and he instilled into them his own enthusiasm for work. It was a pity his field was limited to two small companies.

The artillery reserve companies did exceedingly good work, those at Fort Dade manning Battery McIntosh and the stations at their subcaliber practice. Owing to the danger to the boat the reserve company at Fort De Soto, which was assigned to a mortar battery, fired their subcaliber practice with the stations manned by the detail from the Thirty-ninth Company, Coast Artillery Corps, though their own manning detail was present.

The exercises passed off according to schedule in a very satisfactory manner. The reports show that the militia were satisfied with their treatment and instruction.

There was no disorder, no liquor, no sickness, no untoward incident of any kind.

The sanitary inspection was rigid and both camps were perfectly healthy and the militia went away in excellent physical condition. They left on Monday, October 28, about 11 a. m.

The depletion of the commands made work very heavy.

My relations with the militia and the adjutant-general of the State were very pleasant. The militia officers and men apparently understood from the first that these exercises were for work and not play; there were no amusements possible except fishing from the wharf. Both officers and men were zealous in their work and the camp discipline was excellent. The kitchens were kept scrupulously clean, mosquitoes were few, and hardly any flies—this last in my opinion being the supreme test of camp cleanliness.

All the officers in charge of the supply departments worked well. The work of the district quartermaster, Lieut. J. A. Thomas, Coast Artillery Corps, was very satisfactory.

I think the Government received due value for the money expended.

[Capt. J. C. JOHNSON, Coast Artillery Corps, commanding Fort Dade, Fla.]

During the encampment frequent inspections were made by the district sanitary officer, the militia surgeon, the post surgeon, and by myself. While it took constant hammering to produce the results obtained, in general these camps were kept the cleanest and most sanitary and were the freest from flies of any I have ever seen.

Companies G and M, Second Infantry, Florida State Troops (artillery reserves), from St. Petersburg, Fla., and Tampa, Fla., respectively, far surpassed any expectations that we dared entertain. Each member of the regular details instructed his corresponding number from the militia, under the supervision of an artillery officer, one for each gun and one for the range station.

Captain Moreno, Company M, Second Infantry, Florida State Troops, certainly had his work here at heart and greatly prefers the artillery work to the infantry, as do practically all of the reserves on duty here as such during this encampment.

Company G, Second Infantry, Florida State Troops, is much the better company of the two. The men are well under control of their officers and in everything they have made a fine showing. This company secured seven out of nine places in the range station.

I would earnestly recommend that these two companies be transferred from the infantry to the coast artillery, Florida State Troops. Practically all officers and men of these two organizations heartily approve this transfer and their close proximity to this post would enable frequent visits to the post for drill and further instruction. They are surprisingly enthusiastic over this work. Their subcaliber work was excellent, especially that of Company G. That of Company M would have probably been equal to that of Company G had the latter company fired first.

The officers of Company G looked out for sanitation better than those of any other company here and left things in better shape than any upon their departure from the post.

The schedule of the steamer *Pickering* could be arranged to occasionally bring these companies here for drill. I respectfully recommend that this be done.

Owing to my company, post, and battery duties, I could not personally observe the work of the infantry supports. Lieut. Geo. A. F. Trumbo, Twelfth Cavalry, U. S. Army, worked conscientiously night and day with them and they expressed their utmost satisfaction with his instruction.

In conclusion, everything possible was done to make the camp attractive and the instruction thorough. One aim was to popularize the coast artillery work with the militia companies, especially the artillery reserves. This was fully realized. Both companies now prefer artillery work.

[Capt. FRANK E. HARRIS, Coast Artillery Corps, commanding Thirty-ninth Company, Coast Artillery Corps, Fort De Soto, Fla.]

Company D, Florida State Troops, was encamped beside the Thirty-ninth Company, Coast Artillery Corps. A manning table was prepared dividing the company into 2 gun detachments and 1 range section consisting of the primary station details. The company was shown through the emplacement by the officers and men of the Thirty-ninth Company, Coast Artillery Corps.

The two detachments of Company D with one officer reported to the emplacement officer and were instructed in the nomenclature and drill. The instruction was taken up in detail, one detachment under the direction of Captain McBride, Coast Artillery Corps, being instructed in nomenclature, dismantling of breechblock and the functioning of the piece and carriage generally; the other, standing by the corresponding numbers of the regular detachment and receiving instructions in the drill.

The officers and men showed a commendable zeal and made such notable progress that they were able to load and go through the motions of firing a dummy projectile within the firing interval of one and one-half minutes.

The captain of Company D, E. J. Johnson, reported to me and was instructed in setting up and orienting an azimuth

instrument and in performing the duties of a battery commander. The officer showed great aptitude in learning his duties.

The range section with the other lieutenant were directed to report to the range officer at the primary station, where they received instructions in the duties pertaining to the primary station details.

Subcaliber practice for the militia: This firing was conducted by the militia under the supervision of the regular officers of the company, and from the results attained indicates that the preliminary instructions were well digested and the progress made all that could be desired.

Service practice for the Thirty-ninth Company, Coast Artillery Corps: Owing to the great shortage of men in the Thirty-ninth Company, Coast Artillery Corps, men from the Florida State Troops were utilized at telephones, etc., and in all cases performed their duties intelligently and satisfactorily.

All officers of Company D were present during the practice and took a keen interest in all details.

During the action period blank charges were fired, the Florida State Troops furnishing detachments for two of the mortars. Throughout this period all men, both regular and militia, performed their duties with the greatest zeal and interest.

The following recommendations have suggested themselves in connection with joint army and militia coast defense exercises to be held in future:

1. The rations for the militia companies should be increased 50 per cent in order to provide for the increased appetites arising from the sudden change of occupation and from an open air life on the seacoast.

2. At least 5 copies of coast artillery drill regulations should be furnished to each reserve company permanently, also pamphlets describing the particular pieces and carriages to which each reserve company is assigned.

3. The great success of the exercises just completed shows the wisdom of selecting a period for holding the exercises not earlier than October or later than April in this district.

[Capt. FRANCIS W. RALSTON, Coast Artillery Corps, Fort De Soto, Fla.]

The masters of the several boats used were cheerful in executing whatever orders were given them, this especially applying to the civilian masters of the hired boats on whom fell the brunt of all the hard work done on the water.

The detachments of enlisted men serving on the boats at various times performed their duties intelligently and executed orders promptly.

Recommendation is made that in future exercises the programme be so arranged that all the boats in the district be available for night work. This was impracticable in these exercises through conditions beyond the control of the district commander.

[Capt. JOHN MCBRIDE, Jr., Coast Artillery Corps.]

I reported for duty to the district commander at Fort De Soto and was assigned to the duty of instructing the militia reserves.

Company D, Second Infantry, Florida State Troops, was linked with the Thirty-ninth Company, Coast Artillery Corps, at Battery Laidley.

Great interest was shown by the militia in their new work. They were exceedingly quick to learn their duties.

The noncommissioned officers and men of the Thirty-ninth Company, Coast Artillery Corps, took great pains in instructing the militia and in answering their questions.

The regular company was so reduced in numbers that but one mortar in the pit could be manned by them. The Florida company linked with them had two gun detachments.

I would therefore recommend that in future exercises if the regular companies are reduced in numbers that organizations from other posts be sent to fill up the required number.

On the whole I believe the exercises have been of great benefit to both regulars and militia.

[First Lieut. GEO. P. HAWES, Jr., Coast Artillery Corps, Fort De Soto, Fla.]

The duties performed by me during the exercises were those of range officer, post adjutant, acting district adjutant, in charge of the office of post quartermaster, and commissary.

The militia detail sent from the supports to the primary station showed much interest in the work, but due to faults of communication and the short period before the service practice it was deemed advisable to have them do but little actual drilling and during the subcaliber practice it became necessary to man the station with the regular force.

The Florida State Troops were very enthusiastic, at all times showing interest in the work of all branches. Numbers of their officers have told me personally that both they and their men had received more benefit from the past week's exercises than they had ever obtained from any previous encampment which they had yearly attended.

[First Lieut. HENRY W. BUNN, Coast Artillery Corps, Fort De Soto, Fla.]

During the joint army and militia coast defense exercises in this district, I performed the duties of district artillery engineer, district ordnance officer, and emplacement officer B pit, Battery Laidley.

In my opinion militia troops can be trained into efficient gun and ammunition detachments for mortars in a very short time. Should these exercises be repeated next year it is recommended that the militia reserves be allowed to have service practice under careful supervision. The danger is considerable, but is more than offset by the certain benefits.

The light at Fort De Soto was found of the greatest service to the land defense in searching the shore line of Gulf and bay and bayou. It helped to avert disaster on the night of the 25th by discovering the landing party.

From the artillery point of view the exercises lacked impressiveness for several reasons:

1. The small number of militia. The one reserve company at Fort De Soto furnished only two gun detachments and part of a range detachment.

I have now to suggest a radical departure from the present mode of assigning and training the militia reserves. This is in general to assign them to and train them at guns of 6 inch and smaller caliber only. Very little training is required to make an infantry marksman an expert gunner with a 15 pounder or 6 inch gun. Indeed in subcaliber practice with these guns I believe the militia are already beating the regulars.

I would not attempt to train militia in range section work. At a post where there are more reserves than are needed to man the rapid-fire guns, the extra men might be used for gun detachments for the large caliber guns.

One regular officer to instruct the militia at each 15-pounder battery would be sufficient; one regular officer or noncommissioned officer for each rapid-fire gun of larger caliber. The fact that a rapid-fire battery may be "out of commission" is no objection to its use for this training, the contrary would seem true.

[First Lieut. TRUMAN D. THORPE, Coast Artillery Corps, Fort De Soto, Fla.]

Upon arrival at Fort De Soto, I was assigned to duty as range officer for Battery Laidley, but acted as range observer on October 22 and 24.

The militia assigned to the range-finding detail for instruction were very quick to comprehend the nature of their duties and were able in a very short time to handle any of the range-finding instruments to which they might be assigned. The regular detail from the Thirty-ninth Company, Coast Artillery Corps, were very willing and patient in instructing the militia in the various phases of the work and the best of feeling prevailed.

I believe that after the militia have been sufficiently instructed so that they can handle the guns by themselves, if the militia were assigned to some of the guns of a battery and the regular troops to the other guns, it would bring out a spirit of competition between the regular troops and militia which would tend to excite much more interest in the drill.

[First Lieut. LEWIS TURTLE, Coast Artillery Corps, Fort Dade, Fla.]

During the joint army and militia coast defense exercises held here between October 19 and 28, 1907, I was quartermaster and commissary at Fort Dade, Fla., and battery officer at Battery McIntosh, at said post.

As quartermaster I noted the incinerators worked well, except for a disagreeable odor when first fired. A more efficient smoke consumer should be substituted for the one now used. Less than two hours were required to burn out one pit of an incinerator.

Wash sinks designed by Capt. J. C. Johnson, Coast Artillery Corps, proved a great success in keeping the company streets dry.

It was most difficult to get any fatigue work out of the militia. They even considered it a great hardship to haul their own meat and ice. In policing up at the end of camp they displayed an utter, absolute, and unqualified lack of discipline, burning up rubbish at places the use of which was specifically prohibited—by both written and repeatedly given verbal orders—for such purposes. This defiance of authority took place in the presence and seemingly with the consent of the militia officers.

As commissary I noted the sample voucher, showing how individuals, firms, and corporations should sign for payment received, proved puzzling to the officers of the State troops. It would be clearer if a separate sample for each of these cases were furnished.

As battery officer I noted the militia took hold of the artillery work with surprising rapidity.

Due to the efforts of Capt. J. C. Johnson, Coast Artillery Corps, some blank ammunition provided for the exercises was expended at a time when a big excursion was at the fort. During this firing the guns and range tower were manned by militiamen whose visiting friends took marked interest in the occurrences at the battery. The militiamen were greatly elated by the chance to show their proficiency. Doubtless they had feared that only the infantry supports would get a chance to show off before their friends. Such exhibitions as this tend to greatly increase the interest of the public in artillery work and to give greater esprit de corps to the artillery soldier.

[First Lieut. J. A. THOMAS, Coast Artillery Corps, Fort Dade, Fla.]

The most important duties devolved upon me during this period were those of post ordnance officer of Fort Dade, post quartermaster and commissary of Fort De Soto, and district quartermaster in charge of transportation.

I was in immediate charge of Battery McIntosh, which was manned by Companies G and M, Florida State Troops, as reserves. Their work at drill and target practice was most commendable, that of Company G being especially so, and I

respectfully recommend that this company be made a permanent reserve company for the following reasons:

1. The officers and men unanimously desire the transfer.
2. Their work was excellent in every respect.
3. The proximity of the home station of the company to the coast defense.

[First Lieut. D. C. McDONALD, Coast Artillery Corps, Fort Dade, Fla.]

During the period of the encampment I acted as instructor to Companies G and M, Second Regiment Florida State Troops, being particularly assigned to their instruction in the position finding service.

In this capacity I was very much pleased to find that the men selected by their company commanders for this duty as being the most intelligent and fitted for the position were not only very much interested in the work, but showed a positive genius for it. Their work in the duties of the plotting room was speedily learned, and by the second day the detachment was getting its data to the guns in a time almost as short as it could be done by the regular detachment.

The principle and the duties of the position finding service were first explained to them by the instructor and each number of the regular detachment instructed then the corresponding number in the service detachment in the details of his duties.

After watching the regular detachment at work the reserve was put in their place and after two days could do the work in a very satisfactory manner. Probably the greatest surprise of the encampment was the ease with which the reserve picked up the difficult duties of the plotting room.

Special mention is made of the splendid work of First Lieutenant Potter, Company G, Second Regiment, Florida State Troops, for the interest he displayed and the ability with which he performed the duties of range officer.

It is respectfully suggested that steps be taken to enable the men of the reserve detachment who were so instructed to come out to Fort Dade to continue their work, thereby sustaining their interest and increasing their efficiency. It is further suggested that some of the infantry companies,

preferably those located near the post, be given an artillery formation and designation to enable them to continue the work upon which they have begun.

Should this be done the material necessary for instruction should be sent them.

The great necessity for just some such system of artillery reserve was plainly shown by the fatigue manifested by the detachment after a couple of hours of continuous observing, reading, and plotting. A series of feints by an active and alert enemy could almost entirely destroy the efficiency of a fire command in a very short time unless supplemented by some such system of reserves.

The hearty cooperation of all concerned is absolutely necessary, and was manifested throughout the period of the exercises.

[First Lieut. THOMAS L. COLES, Coast Artillery Corps, Fort Dade, Fla.]

Upon the arrival of the militia I was assigned to No. 2 gun, Battery McIntosh, for the instruction of the militia.

The first day was spent in going over the nomenclature of the gun, the process of its manufacture, its care, its preservation, uses and mechanism. This was followed by assignment to the gun of a complete gun detachment and ammunition detachment. The numbers were assigned, duties explained, and a short drill followed—consisting of instructions in all elementary duties of gunnery. I found that the militia, or my detachment from Company G, Florida State Troops, took a keen interest and learned readily. It was my aim throughout to make things as interesting as possible for my detachment. On the first day the detachment succeeded in loading and firing in thirty-four seconds.

On the second day the detachment was further instructed, 2 preliminary drills being followed by 2 longer complete ones. In this drill the detachment loaded and fired in twenty-two seconds.

I was on duty with tug *Clark* towing targets for the sub-caliber practice for Companies M and G, Florida State Troops. The militia gunners showed good work considering the practice, hitting the target 19 times out of 50 shots, striking the wood 4 times in addition; all shots were close.

[First Lieut. JAMES D. HEYSINGER, U. S. Army, assistant surgeon, Fort De Soto, Fla.]

For out of door exercises in this locality the season of the year was most favorable there having been no excessive rise of temperature, no rains, and comparative freedom from mosquitoes.

Rain water, stored in wooden cisterns, and boiled for thirty minutes before distribution, was used for drinking and proved satisfactory.

While both camps were unusually free from flies, it was noticed that kitchens in sheds and outhouses attracted them in greater numbers than did those constructed of light timber with open sides.

The general policing of both camps was excellent.

The clothing of the men was of khaki, with felt campaign hat and canvas leggings, and was appropriate for this clime, but the cool nights caused some discomfort, especially among those on guard. The shoes worn by the militia were of various patterns, some black, some russet, and even some low or Oxford ties, all of which were uncomfortable on the march and disabled some men temporarily.

The food issued to the men, consisting of the garrison ration, was well cooked and sufficient in quantity.

The fact that there was absolutely no sickness contracted during the encampment, other than those slight injuries incident to camp life, is due in great part to the hearty co-operation of the district commander and of the commanding officer, Fort Dade, together with the admirable spirit shown by the officers of the Florida State Troops in following up and promptly suppressing every breach of field sanitation.

In conclusion, I respectfully make the following sanitary recommendations for future encampments in this district.

1. That for possible emergencies a sufficient number of water sterilizers of an approved pattern be kept on hand. This measure is considered necessary because of the number of green troops coming from possible infected districts, and should typhoid fever develop in camp, the only available drinking water, i. e., rain water, would be under suspicion and boiling as carried out by enlisted men is unreliable.

2. That measures be taken to prevent the shipping to this district of incomplete sanitary apparatus, such as McCall

incinerators, for the health of the command may depend upon the proper working of such apparatus.

3. That all field latrines be provided with barb wire stretched parallel to the seats, and so placed that men can not stand on the seats while using the latrines. Because of the destructive action the ground water has on plumbing at Fort De Soto, it is believed that sea water should be used for all sewer flushing.

4. That the use of metal sinks, connected directly with the post-sewer system, be used for the disposition of all liquid wastes; two for each organization would be sufficient, one large and deep sink in the kitchen for dish washing, the other longer but shallower for the resting of individual wash basins. This arrangement would remove one of the most difficult problems of camp sanitation—the disposition of liquid wastes—as cooks and the men are prone to throw water on the ground thinking it can not be seen, also that carelessness in pouring liquid wastes from cans to the sanitary cart frequently results in the saturation of the ground.

5. That a point be selected outside the company grounds for laundry purposes in semi-permanent camps and the laundry water be either collected and removed or conducted to the post-sewer system.

6. That the use of old sheds and outhouses for company kitchens and mess halls be discontinued and that the light-frame building open at the sides with galvanized-iron or canvas roof be substituted. Also that running water be provided for the covering of all food being prepared in kitchens and mess halls.

7. That all sandy soil to be used for future camp sites be planted with Bermuda or some other rapidly growing grass, as this makes a surface easily kept clean and neat in appearance. It was found that with the deep sandy soil in the company streets the men are apt to cover over cigar stumps, pieces of breakage, etc., instead of picking them up.

8. That the use of bedding sacks filled with straw are unsatisfactory for semi-permanent camps, as loose straw blows about, necessitating the closing of tents during even light winds. For the comfort of the men and the cleanliness of camp, cots should be provided during these maneuvers. and

as severe rains are not infrequent in this locality, sleeping close to the damp ground would probably cause considerable sickness.

9. That the conical wall tent be provided for use in this climate as they are easily kept clean, are well ventilated and give general satisfaction. Furthermore, these tents stand better in the high winds which visit this locality, and as the sandy soil presents a poor holding ground for tent pegs this fact is important.

10. That troops serving in this district in the fall months be provided with one heavy flannel shirt, for sudden northerners are common and cause discomfort. In this connection it is suggested that all the troops be furnished with appropriate and uniform marching shoes, as disability from wearing ill-fitting foot gear is common and preventable.

As a final suggestion I would recommend the thorough physical examination of every officer and man of the militia prior to his departure for the encampment, in order to weed out those unfit for duty at the time and those who might become a source of infection after reaching camp, such as cases of incipient typhoid fever and malarial fever.

INSTRUCTORS OF SUPPORTS.

[Capt. B. C. MORSE, Twenty-ninth Infantry, U. S. Army, Fort De Soto, Fla.]

The troops arrived at this post at noon, October 19, and consisted of the following:

Lieutenant-Colonel Parkinson, Second Infantry, Florida State Troops; Adjutant and Sergeant-Major, Second Battalion, Second Infantry, Florida State Troops; 17 men, band, First Florida; 2 officers and 31 men, Second Infantry, Florida State Troops; 2 officers and 40 men, Second Infantry, Florida State Troops.

This was entirely too small a number of men to get the best results in instruction; there should have been at least one full battalion.

Throwing out two Sundays, the day of arrival, the day of departure, and taking into consideration the fact that the latter was October 28, six days were left for instruction; this was entirely too short. The supports could have been profitably instructed for ten days or two weeks.

The preliminary instruction included patrol duty by land and water, outposts by day and night, advance guard, intrenching, the normal attack by company and battalion, battalion drill in close order, guard mounting and dress parade. In addition detachments were taught the use of Colt's automatic rapid-fire gun, of the heliograph, and acetylene lamp, of the combination buzzer and field telephone, rockets, bombs, and signal pistol, becoming quite proficient in these devices for communicating. Talks were given to officers and men on their duties; these exercises took place from 7.30 a. m. to noon; from 1.30 to 2.30, 4 to 5, and from 7 to 8.30 p. m.

During the action period the exercises included successful resisting at the outposts of an attack by a command from Fort Dade at 3 a. m., October 26, and capture of the fire commander's and primary stations and an 8-inch battery at Fort Dade by two officers and 16 men from Fort De Soto at 8 p. m. the same day. The officers without exception were very attentive to duty and even enthusiastic in its proper performance, taking very kindly to any instruction or suggestion; the men also were willing and many of them showed much intelligence and aptness in special duty assigned them. The entire command improved rapidly and showed marked improvement for the short time it was under instruction.

Not a single breach of discipline came to my attention. The position of this post is very favorable, as the usual influences of a nearby town are entirely lacking. Not a single officer was absent at any time from duty and the men were equally attentive. The formations were promptly made, one company forming in two and one-half minutes after call to arms at night.

The camp ground was good.

The meals were satisfactory and always served on time. I have never seen more orderly or cleaner kitchens and dining rooms. It is believed that these companies bought articles outside the ration; on account of the active outdoor life, the increased appetites, the short time they are in camp, and from the fact that they have no company funds to call upon, it is believed the ration should be increased, so as not to be in any way an expense to the individual officer or soldier.

Almost every man had two suits of khaki and their appearance was good. There were black and tan. Tan shoes should be issued to them. Their arms were the Krag and were in good condition.

The health of the command was excellent, no serious ailments of any kind appearing.

The weather was very favorable during the entire encampment, being bright, warm enough, with very few flies or mosquitoes.

The payment of the troops was made the last day of the action period, and while it did not interfere with the exercises at this post, it was only so on account of its isolated position. The payment should be at some other time or place.

The intelligence of the officers and men, their strict attention to duty, and their desire to attain as much knowledge as possible has made this tour of duty a pleasure. The command is surely a credit to its regiment and State.

[First Lieut. GEORGE A. F. TRUMBO, Twelfth Cavalry, U. S. Army, Fort Dade, Fla.]

The supports consisted of headquarters, noncommissioned staff and band, detachment hospital corps, and 4 companies of the Second Regiment, Florida State Troops.

Instruction imparted to them was practical, and in detail consisted of advance and rear guard, patrol duty, outpost, hasty intrenchment, extended order (to include squad, section, platoon, and company), formation for attack, attack of defensive positions, fire discipline, continuous occupation of selected line of defense under war condition, offensive and defensive action.

The following remarks concerning the militia are here entered:

Great enthusiasm and interest was shown by all officers and men, everyone taking and doing his duty with much satisfaction, and great progress was made. Company I, Captain Wolfe, Key West, and Company F, Captain Moritz, Tampa, are to be complimented on their good showing. Every officer and man in the artillery supports signified that this camp was the best they had ever attended, were better satisfied, and that instruction they received was excellent,

and all wished to return to Fort Dade and again be under that same instruction. It was especially noticed that the sick report was very slight, health of the men was excellent.

The following recommendations are here inserted:

1. Militia companies should be equipped with at least two complete uniforms, as it is their one uniform becomes soiled very quickly and gives them a bad appearance, and especially on their return trip to their home rendezvous. As they travel over the country they should present a neat appearance to their people.

2. Fatigue clothing should be issued.

3. The rifles are not in the best condition.

4. Gun oil should be issued and also cosmoline.

5. More care and attention should be paid by all concerned to the proper cleaning and care of the rifle, and this fact should be emphasized.

6. It is noted that too many young men are enlisted just before an encampment. I recommend that no enlistments be entertained for a period of three months prior to encampment, and that frequent inspection and drill be taken up to prepare for camp.

7. It is noted that sergeants and corporals are not familiar with their drills, not even enough to drill and instruct their men.

8. Gold-metal cots should be furnished.

9. Target practice is a most important factor, for we have to depend on the militia in time of war, and more time and attention should be paid to the individual shot, as there is such a large number of the men who are ignorant of the fundamental principles.

COMMENTS OF MILITIA OFFICERS.

[Col. FRANK X. SCHULLER, commanding Second Regiment Infantry, Florida State Troops, Fort Dade, Fla.]

I would suggest that these periods be of a longer time, not less than two weeks. I earnestly believe the troops derive more benefit and instruction toward actual field service in these joint maneuvers, than in the general State encampments.

It creates a certain amount of competition and rivalry, so to say, and imbues the national guardsmen with a feeling to be or become as well perfected as his brother officer or soldier of the regular establishment. The example placed before him (the guardsman) in these joint maneuvers he naturally endeavors to follow and profit by it.

I would recommend that, if at all possible, the regimental unit be not broken or divided in future exercises of this character, as has been done in this tour of duty—namely, dividing this regiment into three (3) sections, every one independent of each other.

I personally participated in all field movements, generally in the capacity of an observer in company of the instructor, Lieutenant Trumbo, Twelfth Cavalry, U. S. Army. This officer was untiring in his efforts to give both officers and men all the instructions in their duties in the field as the limited time permitted. He was always courteous and painstaking, yet prompt in making corrections. I personally feel that much has been accomplished during this period.

I would further recommend that the militia officers be given more opportunity to carry out their own ideas under the guidance of a regular army instructor, he to make such suggestions and corrections from time to time as he may deem proper; in this manner the militia officers would become more self-reliant, have more confidence in themselves, and assume more responsibility.

The sanitary condition of the camp was at all times perfect.

In behalf of all my fellow officers I thank Capt. J. C. Johnson, Coast Artillery Corps, for his courteous treatment; his daily efforts to have everything that was needed, and the instructions which emanated from his headquarters have been absorbed, so to speak, by everyone. I can not find expressions that will do justice to this officer, this gentleman.

I also thank our instructor, Lieutenant Trumbo, Twelfth Cavalry, U. S. Army; he did more than his duty. Also Lieutenant Thomas (district quartermaster) in whom we took a deep interest.

I wish I had more time, I would like to say a great deal more in words of praise for these gentlemen.

[Lieut. Col. JOHN B. PARKINSON, commanding Second Battalion, Second Infantry, Florida State Troops, Fort De Soto, Fla.]

I have the honor to submit the following recommendations from the standpoint of an officer in the Florida State Troops in regard to future joint maneuvers.

That the State militia receives far more instruction and training by these joint maneuvers than by the usual State encampment can not be denied. With officers of the Regular Army naturally of greater ability in their line of business than those daily occupied with civil life to suggest, advise, and instruct, the militia officers receive practical training impossible to acquire theoretically from text-books. Discipline is better because it can be more easily enforced. The enlisted man, by mingling with those who have had more and better training, will strive harder to acquire similar results at his home station and will feel himself a part of the national defense. The sanitary conditions and health are better under the supervision of surgeons who have facilities for providing and enforcing sanitary measures better than physicians from civil life, who are encamped but a few days annually with the State troops. As the work of the men is but a reflection of the work of the officers, the latter will work more conscientiously when being paid for their services than at a State encampment where, under heavy personal expense, they too often feel that pleasure comes first and business follows secondarily.

Realizing there will be diversity of opinion in respect to the best time for holding these maneuvers on account of diversity of business, I believe the latter part of October or the latter part of April are most favorable. The weather is generally cool and pleasant, much harder work can be done than during the summer, the health is not endangered by sultry weather, flies and mosquitoes, and the winter business is not on. Fifteen days would give double the instruction of ten days. It is of general experience that it takes time to perfect organizations, and, that in the last few days, the results are proportionately greater.

The regimental organizations should remain intact, or if that should be impossible the battalion should not be broken up. The various companies have the opportunity of getting together but once a year; they can only acquire uniformity

by drilling together; the battalion, regimental commanders, and staff officers can only acquire proficiency through experience in practical work.

The programme followed here has been excellent and broad enough to allow each commanding officer to adapt it to the diversified conditions which exist in the various companies, and yet it would have been better if the battalions had not been broken up. Great progress has been made in both close and extended order drill formation, of rear and advance guards, outpost duty, and much instruction received during the various attacks and maneuvers, which could not have been acquired at home stations or in State encampments.

It is the unanimous opinion of both my officers and enlisted men that the instruction received here and the enthusiasm developed will tend to greatly increase not only the efficiency but the strength of the companies during the coming year. On their behalf as well as my own I beg to tender acknowledgments for the uniform courtesy and instruction received from the commanding officer and officers present at this post.

[Maj. L. S. OPPENHEIMER, surgeon, Second Infantry, Florida State Troops, Fort Dade, Fla.]

This department (medical) has gained much valuable information in the practical details of sanitary regulations and the simplification of methods, which I trust will be adopted upon my recommendation by the adjutant-general of the State troops.

The unprecedented health of the militia during these maneuvers is ample demonstration of the above.

I and my assistant surgeon have made two tours of inspection daily at Fort Dade, and one at Fort De Soto, many of which were made in company with the post commander and the surgeons of the posts, who have extended every courtesy to this department.

The members of the hospital corps have been instructed daily by the first-class sergeant of detachment at the post hospital and made material progress in the short time allotted them.

[Capt. A. V. LONG, adjutant, Second Infantry, Florida State Troops, Fort Dade, Fla.]

The splendid and thorough instruction given to the officers and men of this regiment (Second Regiment of Infantry, Florida State Troops) by the United States officers and troops at this post will no doubt greatly improve the efficiency of the State troops of Florida.

[Capt. CHARLES S. NOBLE, commissary, Second Regiment Infantry, Florida State Troops, Fort Dade, Fla.]

I performed the usual duties of regimental commissary during the period October 19 to 28; was treated kindly and courteously by the commissary of the Regular Army, Lieutenant Turtle, Coast Artillery Corps, and the commanding officer (Fort Dade), Captain Johnson.

In regard to the commissary department I have little to suggest, but it is advisable that when the State militia camp with the regular troops that a more liberal ration be allowed, especially in variety; also that a cooling house be provided where ice and fresh meat can be kept, so that a regular issue could be made in the morning instead of at night. Ice issued at night will melt before day, and in the very heat of the day there would be in many cases not any cool water. The meat issued at night and at irregular intervals also was detrimental to the satisfaction of the companies.

The camp has been one of instruction and benefit.

[Capt. DUKE M. HOPSON, commanding Company B, Second Infantry, Florida State Troops, Fort Dade, Fla.]

The need of the militia is special instruction in battalion and regimental drill, where there are a sufficient number of companies present to make these formations. Most of the companies are isolated, so that at encampments of several companies is the only opportunity that company commanders have for instruction in formations of larger bodies than companies. It is certainly important that company commanders have an opportunity of seeing at least larger bodies of troops than companies handled. Fatigue duty, except such as is essential to comfort and hygiene of camp, should be reduced to a minimum. Any fatigue duty which is for the future good and convenience of army posts should be eliminated

and the men and time applied to instruction in military matters.

The time best suited to the convenience of Florida citizens who are members of militia organizations for engagement in camp maneuvers is from July to not later than September 10. While the weather conditions during the period mentioned are not so favorable as October, there is not so much sacrifice from a financial standpoint as later.

As to transportation, I suggest that where it is practical no stopover at night be made en route to and from home stations and destination of camp.

[Capt. PRESTON AYERS, commanding Company C, Second Infantry, Florida State Troops, Fort Dade, Fla.]

Each and every man has performed one tour of guard duty and has received excellent instruction in same by instructing officer.

I believe this to be one of the best instructive camps Company C ever had the honor to participate in.

[Capt. MAX P. MORITZ, commanding Company F, Second Infantry, Florida State Troops, Fort Dade, Fla.]

As to the benefits derived by my command during the maneuvers it is very good. The instruction given my men by the Regular Army officers was good. Much good has been accomplished by this tour of duty. As to recommendations, would say that it is my opinion that much more could have been accomplished had a Regular Army officer commanded the militia, instead of the many staff militia officers, who certainly conflicted in their opinions and authorities, making the maneuvers less attractive.

[Capt. HORACE WILLIAMS, commanding Company G, Second Infantry, Florida State Troops, Fort Dade, Fla.]

Companies G and M formed as artillery—Company G No. 2 detachment, Company M No. 1 detachment. Seven men of Company G in primary station out of total 9.

While here we have received careful instructions from army officers. I want to say in behalf of Company G that the artillery work is much better than infantry. Recommendation is made that this company be transferred to artillery.

[Capt. SAMUEL J. WOLF, commanding Company I, Second Infantry, Florida State Troops, Fort Dade, Fla.]

In closing my report, the commanding officer of Company I desires to thank the commissioned officers of the Coast Artillery Corps for their many acts of courtesy shown and advice and instruction given, and especially Capt. J. C. Johnson, Coast Artillery Corps, and also First Lieut. Geo. A. F. Trumbo, Twelfth Cavalry, U. S. Army.

[Capt. WILLIAM F. JIBB, commanding Company K, Second Infantry, Florida State Troops, Fort De Soto, Fla.]

I have the honor to submit the following comments on encampments of State troops which are based on my personal observation during over three years' service in the Michigan State Troops, two years nearly in the Ohio National Guard, and over twelve years in Florida State Troops.

1. That United State troops be sent to camps of militia always—as the militia soldier will learn military courtesies, care of person, and general camp hygiene far quicker and more thoroughly by observation of regular troops than otherwise.

2. That if practicable State troops be encamped some distance, at least 5 miles, from any town or city, thereby reducing brawls, disorder, etc., the result of visits to cities, and drinking and carousing, which are the cause of dysentery and minor illnesses which deplete the company's strength each morning. The men are healthier, happier, and better contented when they know they can not reach these temptations.

3. My ideal has been realized nearly in the maneuvers just past. Theory has been shown and developed and we have seen why, which is the hardest thing I have found in my experience as a soldier for a militiaman. Our instruction has been practical in every way, our camp location good, climate at present time of year ideal.

4. I would say camps or maneuvers are better held in late fall or early spring, say, October or May as best fitted as to climate in Florida.

5. I would say the Government should issue shoes and shirts so that soldiers would have more comfortable footwear, as the average man does not choose his home footwear with a view to distance marches.

6. Company commanders could arrange issue of shoes and shirts the same as they do other parts of the equipment to enlisted men with a view of making men accountable for property.

[Capt. JAMES F. JOURDAN, commanding Company I., Second Infantry, Florida State Troops, Fort De Soto, Fla.]

No suggestion of mine would better the arrangements made by us as to sanitation or routines of camp or instructions given us by Captain Morse, Twenty-ninth Infantry, U. S. Army, at Fort De Soto.

I would, however, suggest that if 4 or even a squad of regular soldiers would be detailed to actually camp with each company their example of tent arrangement, answer to all calls, formation and example generally would make a more efficient company. That one day at least of each encampment be set aside for regular Army officers to take charge of the companies and battalions and drill them; that charts or blackboards be furnished, and that a lecture be given on battle exercises by some officer of the Regular Army to the officers of the National Guard. Further, that all noncommissioned officers have a separate school of at least one hour daily with blackboard or chart instruction from some officer of the Regular Army.

That in all mimic battles decisions on results be announced at the time of close of such battle or engagement, so that each man who participates in the battle may know what has been accomplished by both the offensive and defensive forces. If any officer or enlisted man especially distinguishes himself in these maneuvers that he be recommended for promotion in orders.

That newspaper correspondents be encouraged to attend these maneuvers and give to the press of the State at least in which they are held as much of a detailed report on these battles and skirmishes (without revealing such data as the War Department would not have published), so that the people at the home of the various companies of the National Guard may know what their soldiers at the front are doing or had done.

I would further suggest that in Florida commencing about the 10th of August would be preferable as the time

for these maneuvers; as after the 2d of September every one in Florida is making preparation for their winter tourist business or crops, and it is really a hardship on most of them to attend.

I really think that at least fifteen days should be devoted to these field maneuvers and that the opposing forces should be not less than one regiment at each camp.

[Capt. E. A. MORENO, commanding Company M, Second Infantry, Florida State Troops, Fort Dade, Fla.]

I heartily approve of the idea of forming coast artillery reserves from companies at seaport cities and raising the enlisted strength up to that of at least one complete manning detail. That they be drilled twice or at least once a month at the batteries to which they will be assigned in time of actual hostilities if distance be not too great from home station and that the Government bear the cost of such transportation. Such bimonthly drills would conform to the requirements of the militia act of 1903. Other instructions on alternate drill nights to be given by an officer or experienced noncommissioned officer of the regular service, detailed for that purpose, to the men in their duties, if the War Department can consistently do so. A large diagram, if same can be allowed, of the guns to which the company would be assigned, together with a small plotting board, with their parts indicated by reference numbers, should be furnished for the purpose of instructing the men in the nomenclature and uses of same.

Separate cards with the duties of each man printed thereon should be furnished and the men required to learn them.

Facilities furnished to men of reserve companies to qualify and stand the required examination for first-class gunners should they so desire and to receive the extra pay allowed for such qualification as provided for by law.

Officers of reserve companies to be required to familiarize themselves with nomenclature and use of parts of guns and range instruments to which their commands may be assigned and to pass a first-class gunner's examination before being commissioned in reserve companies. Facilities to acquire this information to be furnished by the Government. Offi-

cers of commands which may be transferred as reserve companies to qualify themselves within one year.

That distinctive letters be provided for use of officers and enlisted men of the reserve companies for use in conjunction with collar ornaments now in use by the Coast Artillery. On this line I would respectfully suggest the letters C. A. R. (coast artillery reserves) to be worn on the collars in addition to the crossed cannon now worn by officers and men of the regular service.

The daily pay while at joint maneuvers be \$1.50 for enlisted privates, noncommissioned officers to have same ratio of increase based on this pay as is now allowed. Officers to receive same pay as officers of same rank in the regular service.

Officers to be allowed \$25 the first year for uniforms and \$10 per year thereafter.

Duration of joint maneuvers to be not less than fifteen days and more if possible.

The use of McCall incinerators is strongly commended.

In conclusion, I wish to express my deep appreciation of the many courtesies and kindnesses extended to me by the officers of the artillery district and post, and the uniform patience and care taken in instructing the officers and men of my command.

[First Lieut. A. F. BURNS, Company B, Second Infantry, Florida State Troops, Fort Dade, Fla.]

The lateness of the date of the maneuvers made it very hard for the members of the Florida State Troops to leave their businesses for twelve days—which accounts for the small companies in attendance.

We have been instructed in outpost duties, dress parade, and guard mount. We have had some good instruction from the lieutenant of the Regular Army in charge of that duty. I think we have had too much fatigue duty.

[First Lieut. CRAMER B. POTTER, Company G, Second Infantry, Florida State Troops, Fort Dade, Fla.]

Camp most instructive. General satisfaction among officers as well as enlisted men.

[First Lieut. A. E. MCGREW, Company F, Second Infantry, Florida State Troops, Fort Dade, Fla.]

The efficiency of the troops was much improved by the maneuvers and the instruction given by the regular officers. I would respectfully recommend that, hereafter, a Regular Army officer be placed in command of the militia, thereby preventing the many conflicting orders issued by the different militia officers.

I would also recommend that the period of instruction extend over fifteen or more days.

[First Lieut. LOUIS LOUIS, Company I, Second Infantry, Florida State Troops, Fort Dade, Fla.]

I would say that this camp has been the most instructive, to both men and officers, of any at which Company I has ever participated.

[First Lieut. MARK R. WINTER, assistant surgeon, Second Regiment, Florida State Troops, Fort Dade, Fla.]

This Department (medical) has gained much from a military standpoint, especially from sanitary regulations; each soldier profiting thereby when he becomes a civilian.

[Second Lieut. F. A. TAYLOR, Jr., Company B, Second Infantry Florida State Troops, Fort Dade, Fla.]

We have been instructed by Lieutenant Trumbo in different kinds of exercises, also bayonet drill.

The sanitary condition of the camp is good.

We have not had any instruction in battalion drill. I think we should have had more instruction in guard mount, dress parade, and battalion drill.

[Second Lieut. HERMAN BOURGUARDEZ, Company F, Second Infantry, Florida State Troops, Fort Dade, Fla.]

The efficiency of the troops was much improved by the maneuvers and instructions which was given by the regular officers. I recommend that, hereafter, regular army officers be placed in command of the State troops for instruction.

[Second Lieut. JOSEPH R. STIRRUP, Company I, Second Infantry, Florida State Troops, Fort Dade, Fla.]

A detachment consisting of myself, 1 sergeant, 1 corporal and 6 privates, were ordered out to the quartermaster's dock at Fort Dade to guard the entrance and prevent landing at

that point—which duty was successfully done, supported by Company I under command of Capt. Samuel J. Wolfe.

In conclusion, I would say that this camp has been the most instructive, to the men as well as officers, of any at which Company I has ever participated.

[Second Lieut. J. T. JENNER, Company M, Second Infantry, Florida State Troops, Fort Dade, Fla.]

The officers and men were shown through the battery (McIntosh) by the officers and enlisted men of the Regular Army; also the different parts of the gun were marked and explained, and the day was spent in a school, both for the militia officers and men, which I think was conducted in such a way that all learned a great bit about coast artillery.

The men were divided into detachments and assigned to their posts, both at the guns, also ammunition detachments, range tower and secondary station. Each detachment going through the duties assigned to them. Myself being in command of No. 1 gun. Two drills were held in which the men were shown exactly what each had to perform. Such instructions being under regular army officers and enlisted men.

The militia company participated in subcaliber practice, in which they made a fine score, considering the fact that the men were practically unexperienced artillerymen. However, they showed what they could do, and also that with a little more practice they could have done much better.

Sunday there were no exercises, except an exhibition drill during the afternoon, in which blank charges were fired, and the men certainly did fine.

In regard to remarks, can say that I certainly indorse the idea of having Company M, Second Infantry, Florida State Troops, permanently assigned as Coast Artillery Reserves, and further say, as to myself, I have been greatly benefited by this camp, and can speak the same for the men in my company.

[Review by the district commander (Major HUNTER) of reports submitted by militia officers.]

These reports show:

1. That the companies assigned as artillery reserves preferred their duties to those of the companies assigned as artillery supports. In this connection I believe that those

companies nearest forts—i. e., Company I, Second Infantry, at Key West; Company G, Second Infantry, at St. Petersburg; Company M, Second Infantry, at Tampa, etc.—should be assigned permanently as reserves, if a coast artillery corps can not be established in the State.

They could be drilled during the year at the forts and would need no preliminary instruction in artillery matters at the joint exercises, so that upon arrival they could devote some days to much needed instructions at close order formations, ceremonies and the like, so useful for discipline.

2. Battalions should be kept together and a support should not be less than a battalion. The militia in Florida is so scattered that the joint exercises afford perhaps the only chance for the companies of a battalion to be drilled together under expert supervision.

It was remarkable to see the improvement of the two support companies under Captain Morse's admirable instruction.

3. Some of the militia officers wish the militia troops put under the direct command of regular officers. I disapprove of this, as it would tend to diminish the prestige of the militia officers. If any of these are unfit for their places, though I noticed none such, the more responsibility given to them the sooner their unfitness will be established.

4. Recommendation is made that the ration is not sufficient; this is true when one considers that the militia companies are small, their cooks unused to handling the ration, and the men living an unwonted outdoor life of violent exercise on the seashore. I recommend that a ration and a half be allowed each man.

5. Recommendation is made that the United States issue shoes and shirts, to be kept for military purposes. If this is possible, I recommend it. The shoes worn by many of the men were unfit for service. Militiamen should be allowed to buy clothing from the quartermaster's department under proper instructions.

6. Recommendation is made that the camp period is not long enough. I do not agree with this. While I have no doubt of the advance that would be made in the instruction, in the added five days, I noticed that the militia, well pleased as they were with their camps, had begun to grow restless

and many felt that they were losing too much money through their absence from business.

7. As to the time of holding the exercises, while it may work hardships to a few, I indorse the recommendations for early spring and late fall. Good work would have been impossible here during the season of heat and swarming mosquitoes.

8. Recommendation is made that the pay for the enlisted men be increased to \$1.50 per day for privates and a proportionate increase for noncommissioned officers. If this is possible I recommend that it be done. The private is the important man and he is very hard to get in Florida and he certainly suffers in pocket by his militia service.

9. Recommendation is made that the militia have service target practice; the expense may prevent this, otherwise it would be desirable for direct-fire guns. Using Case II no damage can be done, if supervision is kept, but in mortars there are too many chances for error. I am inclined to believe that if possible militiamen should be restricted to the service of direct-fire guns, as they could safely fight the battery with a manning table made from militiamen only. This was shown at Fort Dade.

10. Recommendation is made that some sort of cold-storage room be provided at Fort Dade, as issue of meat and ice should be made in the morning instead of the evening. There is such a storage plant building.

11. Recommendation is made that the duties of each member in the gun detachment be printed on separate cards. Approved.

Artillery District of Pensacola.

[Date of exercises: October 19 to 29.]

COMMENTS OF REGULAR OFFICERS.

[Maj. C. P. TOWNSLEY, Coast Artillery Corps, commanding artillery district of Pensacola, Fort Barrancas, Fla.]

The location of incinerators was not in all cases satisfactory, but it was too late to change them after my arrival (October 8, 1907). Odors of evaporating urine were at times noticeable in camp when the wind was favorable. As a rule incinerators should be located on the highest available

ground near the camp and the stacks carried sufficiently high to insure all odors passing beyond camp limits. No sickness was caused by these smells, but they were occasionally excessively disagreeable. Inside the inclosures of the incinerators no odors were noticeable. They are a success if properly located and attended.

The regular companies provided coffee and sandwiches for these 9 companies (delayed by railroad wreck) as they had no hope of getting a meal for hours after their arrival (10 p. m., October 19). Rations were issued to them promptly upon arrival.

I visited all camps once the following day and most of them twice, and found the State troops generally well contented and pleased. During the encampment I made daily visits to stations, emplacements, or camps, endeavoring to learn the spirit and interest shown by State troops, and to see that their needs were attended to.

In response to my invitation the governor of Florida with his military staff visited the encampment October 24, 1907.

A careful reading of the reports of officers herewith, as well as my own personal observations of the work done and interest shown by the State troops at this post, has led me to the following general conclusions regarding them:

They are at present composed of about 50 per cent of recruits, or men who have never before been in camp. The men are generally immature and young, apparently many under 21 years—one case of 16 years reported.

The officers are generally bright and intelligent, but with few exceptions they were inexperienced in camping, handling of men, economical use of rations, discipline, etc. Their occasional failures along these lines were due more to this inexperience than anything else. Much was learned, however, during the encampment.

There seemed to be a considerable element among the enlisted men and some of the officers, too, who chafed at the curtailment of the usual liberties granted them during their former camps. Col. Wm. Le Fils, First Florida, took a firm and military view on this point and steadfastly held them in hand, insisting upon their being present for all duties required.

In artillery work the reserves generally took a good interest; some did remarkably well in range-finding work and at the guns. This work on the part of the men was in the line of each becoming fairly efficient in the particular position assigned him in the manning table, rather than a general knowledge of the entire system. Some officers and men grasped very well the problems before them and those who did not appreciated generally the necessity for continued effort on their part to master the subject. To be of value as artillery reserves, competent to control and conduct artillery fire, several months' drill would be necessary and even then probably not more than 10 per cent would be reliable in range-finding work.

As artillery supports the 7 companies so assigned did very good work indeed, except Company E, First Florida Infantry. This work was more clearly understood by officers and men than purely artillery work and of course more could be accomplished. In this duty one or two months' steady instruction under a regular officer would, I think, make very reliable supports of them. The officers have had slight experience and possess very little knowledge of such work, but showed commendable zeal in their efforts to learn.

In general I would say that continued drill and association with regulars in camp are quite necessary to place the Florida State troops who were present in this artillery district in an efficient state for use by the Government in case of hostilities. Under the stress of coming hostilities no doubt the objections to the necessary restraints as to liberties would be largely removed. They have not progressed to a point of real enthusiasm for the military profession. There is too much of the idea that an important part, if not an essential, of their encampment is "a jolly good time and lots of liberty to have it." A majority of the officers and many of the enlisted men do not hold this view, but still it is very evidently an important factor among the State troops. Some of the reports of the State officers voice this view, and it was a matter of frequent report in daily papers of Pensacola.

The colonel of the First Florida took a creditable and decided stand against this element and in consequence incurred unfriendly criticism in some press accounts of the camp, both during the camp and subsequent thereto. In this behalf

I would say that owing to the situation of the camps on islands remote from Pensacola it was impracticable to give more liberty to men, even had it been desirable. If anything is to be accomplished in the short period of the camp every man should always be present for all drills.

The surgeon of the State troops has made no report, but has expressed to me his unqualified approval of all sanitary arrangement made, adding that "this was the best and healthiest camp the State troops had had and he had been at every one for fifteen years."

The principal points mentioned in the accompanying reports and my remarks are classified as follows:

PERSONNEL OF STATE TROOPS.

Range details.—Not efficient, accuracy not developed, except at Battery Slemmer, manned by Company L, First Florida.

Gun detachments.—Fair to very good.

Favorably mentioned.—Col. Wm. Le Fils, First Florida Infantry, in his efforts to maintain discipline; First Lieutenant Winthrop, Company C, First Florida, as well equipped for range officer, and Lieutenant Wither, Company H, First Florida Infantry, as showing ability as range officer.

Unfavorably mentioned.—Maj. Dominick Brown, First Florida Infantry, as not reporting for instruction as assistant fire commander (he left camp Monday the 21st of October, and did not again appear). Captain Stephens and Lieutenant Wittle, Company H, First Florida, as having little control of men, no discipline but as interested in duties with guns, etc. Captain Leslie, Company E, ignorant and took little interest. To these I would add Maj. A. B. Small, First Florida, who was absent with leave after October 22, but showed no interest or desire to learn during his short stay. He was assistant fire commander at McRee.

In general, Company L, First Florida Infantry, showed best results and most interest.

Discipline in companies generally lax, men mostly young and immature, and in need of drill of all kinds. Roll calls not properly conducted.

Muster rolls.—These were badly prepared showing little attention to instructions thereon and not ready at hour of muster. Regular officers had to correct and recorrect these rolls before they were of any value as muster rolls.

Remarks.—It is evident that all officers and men are not well instructed or drilled. That the discipline is low and that many of these troops are immature and undeveloped. For artillery reserves extensive drills and instruction are greatly needed. For supports they would do much better and could be put into shape sooner.

In conclusion, I would say that while many defects and deficiencies were observed in the State troops, that as a whole they did fairly good work and that with repeated annual encampments with the regular coast artillery troops they would undoubtedly develop into a force that could give valuable assistance to the regular organizations. The encampment was, I believe, a success and beneficial to both Regulars and State troops.

I desire to favorably mention Capt. E. D'A. Pearce, Coast Artillery Corps, district artillery engineer; First Lieut. A. L. Rhoades, Coast Artillery Corps, quartermaster; and First Lieut. W. K. Wilson, Coast Artillery Corps, district adjutant. Their untiring zeal throughout the encampment contributed greatly to its success.

[Remarks of Col. R. D. POTTS, General Staff, Chief of Staff, Department of the Gulf, in the absence of the department commander, on the exercises in the artillery district of Pensacola.]

Respectfully forwarded to the Adjutant-General of the Army, War Department, Washington, D. C.

In view of the fact that the use of State troops as artillery supports and reserves is largely experimental, and that the expense to the United States is considerable, the accompanying reports have been carefully considered in order to reach a fair conclusion on the merits of the case and to offer some suggestion looking to the improvement of conditions if it is decided to continue these combined exercises. Some of the more unfavorable conditions would seem to be beyond the reach of the military authorities. The fact that the men of the First Florida Infantry were mostly young and immature, poorly instructed, in need of drills of all

kinds, lacking in discipline and, in part, poorly officered, call for remedial action by the State authorities. The time allotted to the exercises is much too short to supply such deficiencies, and State troops not well grounded in the rudiments of their business will not derive anything like the maximum amount of benefit from the instruction imparted. It goes without saying that unless officers and men are thoroughly interested in the work assigned them and determined to make the most of their opportunities there will not be a commensurate return from such camps of instruction. In this connection, attention is invited to the unfavorable mention concerning Majors Brown and Small, Captains Stephens and Leslie, and Lieutenant Wittle, counterbalanced, in part, by the showing made by Company L, all of First Florida Infantry. The work of this company well illustrates what can and should be accomplished with the right kind of officers and men. To warrant further camps the Government should have the assurance that the same organizations will be sent to the same posts year after year, and to this end the State troops most available locally should be organized as coast artillery, and in addition to such drill and instruction as infantry, deemed necessary for State purposes, should receive much elementary instruction as such in their armories. To further this end the recommendation that regular officers and noncommissioned officers be detailed to act as instructors is fully concurred in.

The artillery district commanders should establish the closest relations with the State troops assigned to their district, and with the assistance of their officers avail themselves of every opportunity to lecture, instruct, and drill both officers and enlisted men in their special duties—this as often as circumstances permit and more especially in the period preceding the encampment. I refer more particularly to the companies to be assigned to duty as artillery reserves—but those assigned as artillery supports should not be neglected. Men frequently show a lack of interest in a new subject from ignorance and the conviction that it is beyond their comprehension. It should be the part of the instructors to remove this impression, and for this purpose good noncommissioned officers, who have themselves mastered the more important and difficult duties of the coast artillery, would not only

serve as an object lesson, but be most careful in imparting the practical knowledge required. Such instruments used in fire control and direction as can be spared, even if not of the latest type, might well be issued for use in practical instruction in the armories, as it is more profitable to show a man once exactly how to do a thing with the proper instrument at hand than to tell him a dozen times, and the spirit of competition should be fostered, for most men in their hearts consider themselves as good as another or perhaps a little better. The brighter minds under competent instruction would readily grasp most of the practical details and would prove most valuable in communicating them to others and keeping alive information once acquired. Drill Regulations, etc., can readily be obtained by the adjutant-general of any State upon requisition, the same to be charged against the State allotment. Hence it is not necessary for the War Department to issue them gratuitously. It was noted that the men assigned to duty as artillery supports took more interest in their work from the start and made more progress, for the simple reason that they knew more about it to commence with, and were not actually out of their depth. With more instruction before the exercises, and the elimination of such officers and noncommissioned officers as prove unfit for any cause, the State troops should become efficient as supports. It is suggested that the State authorities should be fully informed in regard to officers or organizations found to be incompetent or inefficient for any cause, in order that the proper remedial action may be taken. I believe it to be a fundamental principle that States bordering on the sea or Gulf coasts, with fortifications located therein, should permanently designate a sufficient number of State troops for duty as artillery reserves and supports, and I fully believe that, under some such system as that outlined above, they could be made a valuable adjunct to the regular Coast Artillery, and would justify all expense incurred.

The recommendations of the artillery district commander in regard to service practice are worthy of grave consideration. It is realized that the time of holding the encampment is determined by many considerations and that the States have to be considered in its selection; still I am of the opinion that it is not necessary in order to meet their con-

venience as to time to place the regular troops at a serious disadvantage in as important a matter as service practice. With practically every organization in the Coast Artillery Corps striving for supremacy in this particular, all should have an equal chance to make good, but this condition does not obtain if some hold their practice at the close of the outdoor period of instruction and others are required to hold it at the beginning.

Colonel Le Flis seems to be a good example of the right kind of officer to command State troops under such circumstances. He refused to yield to the clamor for passes and other privileges that would interfere with the proper instruction of his officers and men and did everything in his power to make the camp a success.

[Maj. WILLIAM F. HANCOCK, Coast Artillery Corps, fire commander, Fort Pickens, Fla.]

States regular coast artillery and reserve companies performed duties with willingness and good judgment and reserves deserve credit for interest displayed. (Comments of district commander: As a general comment, concurred in.)

[Capt. W. F. STEWART, Coast Artillery Corps, battery commander, Battery Worth, Fort Pickens, Fla.]

States that militia did well in pits; not the case with range sections—did not grasp this. (Comments of district commander: This is what might be expected from any troops previously ignorant of coast artillery work.)

Recommends detail of army officer to instruct at State armory. (Comments of district commander: Unquestionably advantageous to militia provided instruments, etc., can be supplied for such purpose to them. Until they express a desire therefor and show deeper interest in the subject I do not believe such instruments should be furnished them.)

Recommends canvas clothing for militia at guns. (Comments of district commander: Concurred in.)

[Capt. L. S. EDWARDS, Coast Artillery Corps, battery commander, Battery Pensacola, Fort Pickens, Fla.]

States that reserves showed little interest at first, but did better next day at guns. Range detail could do little with equipment. Aptitude of Company H only fair. (Com-

ments of district commander: Evidently poor material in this reserve company—H, First Florida.)

States Captain Stephens and Lieutenant Wittle, Company H, not of much service in an artillery emergency. Handled men with gloves; no idea of use of ration; poor order, etc. Men wanted a good time and little work. Men immature.

[Capt. J. B. DOUGLAS, Coast Artillery Corps, battery officer, Battery Worth, Fort Pickens, Fla.]

States State troops alert and ready to learn—but hopeless task to develop into valuable adjunct to Coast Artillery in short time. Service of piece good, but did not grasp range work.

States that some (militia) expressed desire for artillery instruction at home stations.

[Capt. G. T. PERKINS, Coast Artillery Corps, range officer, Battery Pensacola, Fort Pickens, Fla.]

States militia troops showed great readiness in learning instruments at B' Pensacola. (Comments of district commander: This is at variance with Captain Edwards's report, above.)

[Capt. L. S. MILLER, Coast Artillery Corps, battery commander, Battery Slemmer, and fire commander, Fort McRee, Fla.]

States improvement shown by reserves: $22\frac{1}{2}$ seconds to load and fire by gun detail. Range section did excellent work at twenty-second intervals, on fifth day of camp. (Comments of district commander: This shows keen and intelligent work by Company L, First Florida Infantry, as well as careful work of instruction by Captains Miller and O'Connor, Coast Artillery Corps.)

Recommends that steps be taken to organize a coast artillery company at Pensacola. (Comment of district commander: Concurred in.)

[First Lieut. W. K. WILSON, Coast Artillery Corps, adjutant artillery district of Pensacola.]

Recommends season for camp be April or May. (Comments of district commander: Concurred in.)

Recommends one incinerator for each 2 companies and a separate one for officers. (Comments of district commander: Concurred in for long camps at rate of 1 for each 100 men. Officers should have separate ones.)

[First Lieut. A. L. RHOADES, Coast Artillery Corps, quartermaster, Fort Barrancas, Fla.]

States officers and men understood but little in regard to transportation, supply, police, and company interior economy. Insufficient details to handle baggage. (Comments of district commander: Concurred in. This was everywhere evident but improvement was shown by end of camp.)

Recommends detail of an officer to instruct in movements by rail and water, cooking, etc. (Comments of district commander: Nothing better than actual experience for this. Existing orders and regulations give all theoretical information needed.)

[First Lieut. F. W. HINRICHS, Coast Artillery Corps, battery commander, Battery Cullum, Fort Pickens, Fla.]

Personnel of Company C, First Florida, undersized—one 16 years old. Discipline lax, but improved. (Comments of district commander: Concurred in.)

States attention at guns fair. First Lieutenant Winthrop, First Florida, well qualified for range officer. (Comments of district commander: Concurred in.)

[First Lieut. GLEN F. JENKS, Coast Artillery Corps, battery officer, Battery Worth, Fort Pickens, Fla.]

Thinks militia could be made efficient in short time. Non-commissioned officers progressed relatively less than privates—performed duties perfunctorily. Officers absent from pit A. (Comments of district commander: Evidently some good material that only requires drill and discipline.)

Recommends instruction at home stations.

[Lieut. W. TIDBALL, Coast Artillery Corps, communication officer, Fort Pickens, Fla.]

Thinks regular companies with whom reserves are linked should aid in preparation of muster rolls. (Comments of district commander: This was done; but these rolls should be ready upon arrival of State troops and in an inefficient way had been so prepared.)

States that plotting details were not reliable. Recommends instruments, books, etc., for militia at their armories.

Recommends detail of army officers to instruct at armories, act as examining board; gunners' badges for those who pass. (Remarks of district commander: Concurred in.)

[Contract Surgeon J. L. SANFORD, U. S. Army, Fort Pickens, Fla.]

The health of the troops during the period covered by the maneuvers was good. Four men were admitted to hospital during this time. Two of these had malarial fever, the men affected belonging to the Fifteenth Company, Coast Artillery Corps, permanently stationed at Fort Pickens. Of the two cases admitted to hospital from the militia, one was a case of erysipelas that was transferred as soon as recognized and isolated. The other was a case of chronic ulcer of the leg.

A few cases of minor injuries and illness were treated in quarters by the militia surgeons. (Comments of district commander: An excellent showing for about 900 men in camp.)

INSTRUCTORS OF SUPPORTS.

[Capt. J. E. CUSACK, Twelfth Cavalry, U. S. Army, Fort Pickens, Fla.]

States officers and men keenly interested. Large percentage new men. A few men did heavy work handling baggage, remainder disinterested spectators, due to failure of company commanders to require work of men. Tentage jumbled together. Commander of attacking force failed to carry out instructions, but men took advantage of cover and good order prevailed. Errors of command, but fire discipline very good. (Comments of district commander: There is only the comment of lack of drill and previous instruction to explain this. The report shows much improvement during camp but there is need of discipline and drill being continued.)

States time too short to produce efficiency. (Comments of district commander: Concurred in.)

Recommends that one army officer and one noncommissioned officer be assigned to duty with each two companies of supports. (Comments of district commander: No doubt better instruction would result and the experience would be beneficial to both officers and noncommissioned officers.)

Commends Colonel Le Fils, First Florida Infantry, on efforts at discipline. (Comments of district commander: Concurred in.)

[First Lieut. J. M. BURROUGHS, Twelfth Cavalry, U. S. Army, Fort McRee, Fla.]

States that discipline was very lax in all the companies at the beginning and especially so in Company E of the First Regiment. The company commander (E), Capt. E. A. Leslie, while an intelligent young man, was not posted in any of the duties of his office. He is given to laziness and displayed but little interest in the instruction or the welfare of his company. The noncommissioned officers were totally inefficient and incapable of giving instruction even in the school of the soldier. Rations for 50 men for five days were issued upon arrival of the company and these rations were consumed by the 23 men constituting the company in three days. (Comments of district commander: Evidently a poor company from top to bottom and of no use to the State or United States. It should be mustered out or thoroughly reorganized using much new material. The marked improvement shown at end of camp was due to Lieutenant Burroughs's personal close attention and not to officers or non-commissioned officers of this company.)

COMMENTS OF MILITIA OFFICERS.

[Col. WILLIAM LEFELS, commanding First Infantry, Florida State Troops.]

The instructions received at the hands of the regular officers, both theoretical and practical, was much more thorough than was ever before given the Florida State Troops and the result of the efforts of these officers for the betterment of the militia was shown in a marked manner by the decided improvement made by them both in discipline and drill. The spirit of harmony which existed between the regular and militia officers is largely responsible for the good results obtained. There was no friction, no antagonism, but all worked for the general betterment of the troops.

There was an abundance of pure and wholesome water. The incinerators used were a decided improvement upon the old system of latrines and were an ideal safeguard against infectious diseases. There was no sickness of a serious nature reported.

The ration was ample and of the best quality and had it been properly handled and apportioned by the company commanders there would have been plenty at all times. Some

of the companies with a roster of less than 50 men used their entire five days' rations within three or four days and as a consequence ran short of subsistence before the second issue of rations was made. It was noticed that the second issue of rations, which was made on the 24th instant, was better taken care of than the first.

The regular officers were patient and painstaking and seemed ever ready and willing to lend assistance by kindly coaching and instructions. The officers and men of the Florida State Troops, as a general thing, showed a willingness to do as directed. They showed an intelligence and attentiveness that was commendable, making an honest effort to perform the duties which had been mapped out for them. The exercises as a whole were very satisfactory and it is the opinion that the instructions received by the militia and the work done by them will prove productive of considerable good. It is a pleasure to record the courteous and considerate treatment of our officers and men by the Regular Army officers.

(Comments of the District Commander: From the tone of Colonel LeFils's remarks it is evident that he feels that much was learned during the camp, that he appreciates the efforts made to instruct the State troops, and appreciates, also, very well, the lack of experience among many of his officers and men. Battle command work was explained and shown Colonel LeFils:)

[Capt. J. L. LEWIS, commanding Company C, First Infantry, Florida State Troops, Fort Pickens, Fla.]

I have attended 7 State encampments of State troops and I am frank in saying, in my humble opinion, that the men showed more interest and gained more information than at any encampment I have ever attended and while it necessitated the commanding officer of the Seventy-sixth Company, Coast Artillery Corps, Lieut. F. W. Hinrichs, to be constantly on duty for the ten days from 6 a. m. to 10 p. m. I can not say too much for his untiring efforts to impart information to my company.

I think the joint exercises should be encouraged, especially between the coast artillery and the Florida State Troops. I hope that an effort will be made to continue the joint encampments and make the time thirty days instead of ten or twelve.

[Capt. J. W. BLANDING, commanding Company H, Second Infantry, Florida State Troops, Fort Pickens, Fla.]

The exercises were very interesting and the most instructive of any that I have ever participated in and I know of no suggestions that I could make that would improve same.

As a rule the men seemed to take an interest in the work and do all they could to make it a success.

I consider the camp a decided success.

[First Lieut. J. F. WARREN, adjutant, Third Battalion, First Infantry, Florida State Troops, assistant communication officer, Fort Pickens, Fla.]

I believe that the idea of having the State militia to encamp with the regulars is capital, but know from expressions of different men that the duties are too much to expect of a militiaman and the pleasures connected with the exercises are too small. I think that the men should be allowed some privileges during the encampment and I am afraid that if the idea of not allowing this is known to the men that the membership of the State militia will fall off to a large extent. From my personal observation and from talks with the officers of this battalion the men are all very much taken with the coast defense and I think could be depended on for good service in case of there being need of it, but their patriotism is not so much as to wish to serve as regulars for ten days and not be allowed some few privileges. This in my opinion is for the good of the service in the State militia.

The success of these exercises is largely due to the courtesy and the willingness of the officers of the Regular Army to show the militia everything that they could.

[Second Lieut. J. M. WALKER, Company C, First Infantry, Florida State Troops, assistant battery officer, Battery Cullum, Fort Pickens, Fla.]

The shutting up of the enlisted men as was done, allowing no passes, I think, will greatly injure the State troops and be of no benefit to the service.

STATE OF CALIFORNIA.

Artillery District of San Diego.

[Date of exercises: July 5 to 20.]

COMMENT OF REGULAR OFFICERS.

[Maj. GEORGE W. GATCHELL, Coast Artillery Corps, commanding Artillery District of San Diego, Fort Rosecrans, Cal.]

The regular officers detailed to attend these exercises were of great assistance, in fact, without them the exercises could not have been as satisfactory. The district commander was so busy with the artillery instruction and general supervision that he had very little time to devote to the supports. All of these officers gave valuable assistance.

Captain Graves practically had charge of the instruction of the supports and much of their progress was due to his personal efforts. Lieutenant Olsen ably assisted him and did valuable work in instructing in reconnaissance, map making, and map reading. In addition he also made the greater part of a map of the reservation which will be valuable in the future. Captain Hunt made himself generally useful, and seeing things with the eyes of an outsider was able to lend a number of pertinent and helpful suggestions as the result of observations from the water.

The regular officers of the garrison, with Lieutenant Ferris, Sixth Field Artillery, attached, are to be commended for the interest shown and their painstaking in imparting instruction and promoting good fellowship with the militia officers.

The conduct of the militia during the exercises was, on the whole, a pleasant surprise. They are deserving of commendation especially for the interest shown in their work and for progress made.

Lack of preparation in drill was somewhat apparent with the supports.

The equipment brought by the militia was not quite complete. No shelter tents were brought nor any cots.

Through some mistake the hospital detachment did not bring sufficient tentage. Cots and tents were furnished from the post to supply wants as far as possible.

The militia were not furnished tent floors.

As the recent exercises have proved such a success it is recommended that they be repeated annually. It is believed, however, that artillery reserves should be organized as such under Federal control. The supports might well be from National Guard infantry, but the reserves should be from men whose military career shall be devoted exclusively to coast-artillery work. Such reserves could be organized near artillery districts where regular officers and noncommissioned officers could be sent quite frequently to give instruction. Commanding officers of militia regiments would not care to have portions of their commands repeatedly taken from them for such work and it will be only from repeated instruction that the best results will be obtained.

If militia is sent both for reserves and supports it is recommended that regiments be sent intact. Most militia regiments do not rendezvous as regiments oftener than once a year when sent to camp and no district is so small as to require less than a regiment if the companies can not report in greater strength than this year at this district.

It is recommended that when militia travel by rail to and from camps of instruction at least one officer of the Regular Army, who is to act as an instructor in the camp, travel with them to observe and see that vouchers and bills of lading, with which the militia are not familiar, are properly made out and handled.

Militia ordered to camp in this district should be directed to bring cots and shelter tents.

Militia should be cautioned not to take men to camp who are sick and liable to become unfit for duty.

It is recommended that, if practicable, the status of militia engaged in exercises with regulars be more clearly defined. As matters stand now the situation is unsatisfactory. While drawing pay from the Government they are not actually mustered into the service of the United States, so that the power to control them is very limited. While apparently the attempt is made to apply some of the provisions of the act of January 21, 1903, it is difficult to see how they can apply when militia is not formally mustered into service or to see that they have actually been in the service unless formally

mustered out or properly discharged. Occasions will continue to arise where the War Department ought to take action but can not, as happened during the exercises here when a member of Company A, Fifth Infantry, National Guard California, died while being sent to his home and the War Department could do nothing with the remains.

It would seem that as the exercises or maneuvers are now conducted the militia has no different status than if serving alone in a State camp, subject to State laws and regulations.

When serving at a post the post commander has, of course, the same authority over them that he has over civilians living at the post; if the service be away from a United States reservation it would seem that no regular officer, no matter what his rank, has any authority over them. At any rate it is believed that the situation is not clear to either the Regulars or the militia.

[Capt. H. P. WILBUR, Coast Artillery Corps, commanding Twenty-eighth Company, Coast Artillery Corps, mine commander and commanding Batteries McGrath and Fetterman, Fort Rosecrans, Cal.]

Recommends continuation of exercises from year to year and that enough militia be detailed to furnish, with regulars, at least one relief for each gun and one or more reliefs for each observing station, searchlight, and mining casemate, and that some decision be arrived at as to the relative rank of regular and militia officers at the batteries.

[Review of Capt. Wilbur's report by district commander.]

The question of relative rank of regular and militia officers is included in that of fixing the status of the militia when at these exercises. If militia could be furnished in sufficient numbers to furnish one complete relief and in addition could be sufficiently well instructed to take complete charge, this question would not arise.

[Capt. F. L. DENGLE, Coast Artillery Corps, commanding One hundred and fifteenth Company, Coast Artillery Corps, and Battery Wilkeson, Fort Rosecrans, Cal.]

Reports going into camp July 5, and arrival of militia reserves and assignment of Company K, Fifth Infantry, National Guard California, to Battery Wilkeson; that instruction given at battery was progressive; that reserve B' detail

took places of regular detail during last week of exercises and rendered satisfactory service; that militia were keen and observant, and were able after one day's coaching to execute drill prescribed for 10-inch breech-loading rifles. Reports part taken in last day's attack on supports. Believes exercises an unqualified success. Recommends organization of a permanent force of coast artillery reserves to form a part of the Federal forces. Commends First Sergt. J. E. Peckham for excellent work as instructor of gun detachment of reserves.

[Review of Captain Dengler's report by district commander.]

I agree with Captain Dengler in recommending organization of reserves under Federal control for reasons given in my own report.

[First Lieut. CHARLES J. FERRIS, Sixth Field Artillery, attached to Twenty-eighth Company, Coast Artillery Corps, serving with Battery Fetterman, Fort Rosecrans, Cal.]

Reports that militia showed surprising aptitude and zeal and became capable of rendering valuable assistance in event of war. Recommends that exercises be repeated annually; that coast artillery officers be detailed as instructors and inspectors of coast artillery militia; that militia be supplied with Morris tubes, artillery text-books, dummy cannon, sights, and other portable parts of coast artillery equipment; that use of black powder at exercises be abolished; that allowance of subcaliber projectiles be increased 50 per cent for 10-inch and 5-inch guns and 25 per cent for 15-pounders; that an allowance of Simple tracers be granted for night subcaliber practice.

[Review of Lieutenant Ferris' report by district commander.]

Should coast artillery reserves be organized then it would be well to issue to them text-books and such material as could be spared after regular troops are supplied. However, the bulk of practical instruction should be with regulars at sea-coast forts. I believe that the supply of subcaliber projectiles furnished for those exercises was ample—all that could be used profitably in the time available.

I would not recommend the allowance of Simple tracers. Night firing would be attended with too much danger to

boats that might be passing but still be unseen, being out of the beam of a searchlight and yet in the line of fire.

[First Lieut. EARL MCFARLAND, Coast Artillery Corps, with One hundred and fifteenth Company, Coast Artillery Corps, at Battery Wilkeson, Fort Rosecrans, Cal.]

Performed duty as range officer at B', or as battery officer at Wilkeson, or as chief of platoon during infantry exercises. Found difficulty in giving instruction on account of necessity for using unfamiliar technical terms; recommends, therefore, that officers of coast artillery be detailed to instruct militia, that is, to act as reserves, along lines followed in gunners' school, such instruction to be carried on throughout the year. Believes results of exercises show that organized militia, cooperating with regular companies, can, in a week's time, be relied upon to effectively man coast-artillery works. Thinks militia lacks in discipline, but believes same due to lack of training, for the steady improvement showed willingness to work and eagerness to learn. Found attack on supports unsatisfactory as passed through only initial phase. Found subcaliber blank ammunition satisfactory and recommends that firing of large charges of black powder be dispensed with entirely. Recommends following suggestions of militia officers as to time and length of encampment. Reports that the kindest and most genial feeling prevailed at all times between regulars and militia, both officers and men.

[Review of Lieutenant MCFARLAND'S report by district commander.]

I believe that much artillery instruction could be given to militia at their armories. Such instruction should be given only to troops that are to be detailed as reserves. In one week of practical instruction very much can be done to make militia fit to fill minor positions at guns—the exercises just held have demonstrated that—but that is only one step toward making the well-rounded artilleryman; we can only say that these men have just begun.

INSTRUCTORS OF SUPPORTS.

[Capt. O. E. HUNT, Eighteenth Infantry, U. S. Army, observer, umpire, and general assistant, Fort Rosecrans, Cal.]

Considers progress of instruction of militia satisfactory and that officers and men of both regulars and militia deserve praise for thoroughness and earnestness of work.

Recommends that for future exercises in this district at least a regiment of militia be assigned, that permanent camp sites be prepared, that period of encampment be of sufficient duration to permit of instruction of all troops participating in both artillery and infantry duties; that these exercises be repeated each year.

[Review of Captain HUNT's report by district commander.]

I agree with Captain Hunt as to one regiment of militia for future exercises. There is too much ground to cover for one small battalion of supports even if they work night and day. I consider the whole duty of coast artillery to be to man the elements of coast defense. The work of the supports is that of a mobile force comprising generally all branches. An essential feature is missing if the work is not concurrent, as the district commander loses the opportunity of directing both forces at once, a thing he would have to do in war, as the enemy would surely strike by land and sea at the same time.

[First Lieut. H. O. OLSEN, Eighteenth Infantry, U. S. Army, instructor of artillery supports, Fort Rosecrans, Cal.]

Reports that exercises were preceded or followed by an informal conference to elucidate the principles followed and objects sought; that in addition to duties pertaining to execution of maneuvers he gave theoretical and practical instruction to junior officers in military sketching and map reading, in the construction of field lines, of information in visual signaling, day and night; that considering the short period of instruction results were very satisfactory; that during last outpost exercises the line for information was laid practically while the command marched from camp to its night position and that the commander of the outpost was in direct communication by wire with the principal parts of the outpost by the time it was fully established. Reports work as very gratifying on account of exceptional eagerness exhibited by officers and men to learn methods of regulars. Considers best results obtained from maneuvers held on the scale of exercises here, as all can readily see why assigned a certain function, which thing is often lost in maneuvers on large scale. Believes troops should alternate as reserves and supports. Does not think individual efficiency of militia in gar-

ri-son training as good as might be expected, but thinks that as a fighting unit the supports produced creditable results. Recommends that exercises be repeated. Believes regiments of militia should be kept together and not scattered. Thinks period for exercises should be known well in advance of dates set.

COMMENTS OF MILITIA OFFICERS.

[Col. D. A. SMITH, commanding Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

States that officers of post took every care and great pains to make exercises both interesting and instructive.

Gives opinion that joint exercises were a complete success and that benefit derived by National Guard of California can not be overestimated, that the aid and assistance given by the officers of post to visiting troops created a feeling of cordiality and friendliness which went a great way toward making the exercises a success. Recommends that entire regiments, instead of parts thereof, be sent as regiments, so that they may be under control of regimental officers directed by Regular Army officers.

[Capt. H. G. MATHEWSON, adjutant, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Reports as to visits to B' and F' stations to become familiar with range finding and ship tracking, found same very interesting; also as to visits to mining casemates and to rapid-fire guns.

Found lectures very instructive.

Is satisfied from his observations that national guard troops can readily be made of valuable assistance to coast artillery. Says that lack of technical knowledge by militia officers was greater handicap than that of the men. Considers that the encamping of national guard troops alongside regular troops has great influencing effect for good.

Remarks favorably on courteous attention shown, the patience in repeating explanations, the welcome and spirit of fellowship on part of regular officers.

[Capt. FRED W. PETERSON, commanding Company A (reserves), Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Considers that organized militia have demonstrated beyond a doubt that it would make a valuable addition for

coast defenses, that gunners are quickly developed, and that men soon become proficient in handling the guns.

Suggests that coast companies of National Guard be formed into coast artillery regiments and that artillery textbooks be issued to all coast militia; that an artillery officer be appointed district inspector and instructor, one of whose duties shall be to give instruction; that encampments be held at artillery stations not less than once a year, and that every opportunity be given reserves for practical work at artillery stations.

[Capt. W. S. GRATTAN, commanding Company H (supports), Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Considers the uniform courtesy and good will shown by the post commander and all officers and members of commands of the regular service as the most important feature of the maneuvers.

States it is essential that location and date of camp should be announced months in advance to secure good attendance at these exercises. Men need time to arrange for vacations.

Believes it would have been better to have confined the work to that of artillery reserves.

Believes that National Guard of coast States should be of coast artillery arm of the service and that instead of being a State institution they should be a truly national adjunct under control of the Federal Government.

[Capt. C. J. MUND, commanding Company K (reserves), Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Reports sanitary conditions and bathing facilities excellent; messing arrangements most complete.

Considers knowledge gained as valuable for future, and recommends the holding of these exercises annually.

[First Lieut. R. J. FANEUF, battalion adjutant, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Considers instruction received by him could not have been more practical.

[First Lieut. L. C. FRANCIS, Company A, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Believes encampment was a decided success and demonstrated that the organized militia is entirely competent to take up duties of artillery reserves on short notice.

Believes that enlisted men of a militia company would be competent to undertake their part of the work at a battery after thirty days' training, but officers would need a great amount of theoretical instruction. Suggests that text-books and theoretical instruction be given all militia organizations. Deems it especially necessary that commissioned officers should take up a course of study previous to an encampment of this kind.

[First Lieut. W. H. HOMER, Company K, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Recommends that State troops be instructed annually in work of coast defense.

[First Lieut. FRANK S. EMMAL, assistant surgeon, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Reports that location of camp was good; that water and rations were good; that there were no cases of stomach or bowel troubles coming under his observation. Reports that although the shower baths at support camp were almost useless on account of no water in pipes or tank the splendid arrangements of bathing facilities at the fort were appreciated and well patronized by all.

[Second Lieut. MYER HERMANN, Company A, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Believes camp a success and that work has shown that the coast militia companies should be formed into coast artillery reserves; suggests that such organization be permanent.

[Second Lieut. G. W. KUEHN, Company K, Fifth Infantry, National Guard California, Fort Rosecrans, Cal.]

Acted as range officer during morning exercises and was present at battery drill during afternoons.

Believes that if the exercises and instructions could be continued yearly an efficient artillery reserve could be created in the organized militia.

Recommends course of lectures at armories by an officer detailed from Regular Army.

Artillery District of San Francisco.

[Date of exercises: July 5 to 20.]

COMMENTS OF REGULAR OFFICERS.

[Col. J. A. LUNDEEN, Coast Artillery Corps, commanding Artillery District of San Francisco, Presidio of San Francisco, Cal.]

Regular officers were detailed to go to Oakland, Point Richmond, and Tiburon to meet the incoming organizations and give them all the information and assistance possible.

Noncommissioned officers were detailed to conduct the organizations to their camping places.

All the organizations were far below their maximum strength.

The average for the Seventh Regiment was about 43 per company, while for the Second Regiment it was about 28 per company, and for the Fifth Regiment 22 per company.

One signal corps company reported with 39 men, the other with 10.

Nearly all companies reported with a full complement of officers and the battalion, field, and staff and hospital corps nearly all had a full complement of officers and enlisted personnel.

The reasons for the small attendance are explained in extracts from reports of various officers.

The militia officers expressed themselves well pleased with the services of the subsistence department.

Rations were issued for periods of about five days in order to make them last better. There were very few purchases at the commissary.

Most militia officers reported that the ration alone was not sufficient to subsist their men properly.

It is a pleasure to note that during the entire period of the encampment there was no accident to mar the success of the exercises; there was no friction of any kind between the regulars and militia; the conduct of the men during the encampment was excellent.

The enlisted men of the militia organizations, in particular the reserves, took their work seriously, were enthusiastic about it, and learned rapidly.

The comments of officers, observers, and the local press in regard to the reception and treatment of the militia, their behavior and progress, were all favorable.

His excellency, Governor Gillett, visited the Presidio and Fort Winfield Scott on Thursday, the 18th, and was an interested spectator of a part of the exercises for that day. He expressed himself as pleased at the enthusiasm and progress of the militia.

It is recommended that future encampments be held in May or early June or in October on account of more favorable weather conditions here, as well as the fact that harvesting the crops, gathering the fruit, etc., will not prevent a full attendance of members of the organizations during those months.

[Lieut. Col. F. MARSH, Coast Artillery Corps, commanding fire command No. 4, Fort Winfield Scott, Cal.]

The method of instruction in this fire command was for the men of the militia to be observers merely at the first two drills, then a man was placed beside each man of the regular detachments to watch him during drill, and finally the militia were drilled directly.

After the first few days selected men were taken into the B' stations and instructed in the use of the plotting and correction boards. The men learned the drill at the guns quite readily, although they did not have sufficient time to become very expert, and good progress was made in the plotting stations.

During the time available for drills at the guns the four militia companies made very creditable progress. The men would have made a superior class of recruits. They were uniformly well-behaved and showed a marked interest in the work during the entire period. The experiment shows that good men who have had a small amount of military discipline and instruction are immediately useful in the coast artillery and that with a month's work they would be generally equal to the regular companies in the service of the piece, and also that it would generally be possible to find a good percentage capable of becoming experts in the range and position-finding services.

Men working at the guns ought to have canvas clothing as otherwise their uniforms suffer, and every company officer should have a copy of the Coast Artillery Drill Regulations.

[Lieut. Col. A. SLAKER, Coast Artillery Corps, commanding Fort Baker, Cal.]

In conclusion I desire to recommend that future exercises be held early in the month of May on account of foggy weather which prevails here until late in the autumn. That more infantry, one entire regiment, be encamped here and that different tactical problems be worked out involving the use of the coast artillery in defending batteries, as might happen in an emergency, and that as at present as much target practice as possible, both subcaliber and service, be held during the encampment.

To make this a success more powerful tugs should be hired and there should be more of them.

As a result of my experience during these exercises I desire to report that they were successful, especially in regard to the important matter of arousing interest in the militia in defending the locality near their homes. At least two of the companies desire permission to visit Fort Baker between camps (on some Saturdays and Sundays) for the purpose of perfecting themselves in the use of range finders, etc. If such applications come in it is my intention to forward them approved. Interest largely centered in the artillery work.

One company (M) asked and obtained permission to act as an artillery reserve company instead of a support, taking the place of a company detailed as a reserve, but which failed to come at all.

The arrangements for transportation, both going and coming, were perfect. There was no delay whatever and the baggage was promptly moved to and from the camps. In order to secure this result and to insure proper transportation of supplies to the widely separated camps it was necessary to hire two four-horse teams with drivers at a cost of \$12.00 a day for the entire period of the encampment.

The conduct of the militia was extremely good. They were punctilious in the matter of saluting their own officers as well as those of the regular garrison, and they were

quiet and orderly both day and night. Not a single case of drunkenness was observed or reported. This record was marred by some unauthorized shooting of a few blank cartridges on the night of July 19, said to have been done by members of Companies B and M. One captain reports that every man wore out a pair of shoes valued at about \$3.50 and that he thinks the ration is not sufficient. I feel that all of the companies had to add to the ration, but this was partly due to lack of experience in handling the ration and more to the abnormal appetites developed by the unaccustomed outdoor life. A similar condition prevailed with the regular troops, but not so marked. In the matter of clothing I recommend that one pair of good shoes and a suit of canvas fatigue clothing be issued to each man at the expense of the State. The blue uniform should be worn, as khaki is not heavy enough and soils too easily.

Attention is invited to the report of the battalion adjutant in regard to the small number of men present in each company. This was largely due to the unfortunate time of year selected for the exercises in this State. Every one agrees that they should be held either earlier or later, and if the greatest measure of success is desired it should be in the first half of the month of May. I also believe that the idea of working with the coast artillery was not a popular one. Very little was known about it, and there was an element of uncertainty about the whole proposition, which undoubtedly turned the scale in many a doubtful mind.

These doubts were all dispelled at this post, and I believe that all the complimentary expressions found in the accompanying reports are sincerely meant, and the result will be that a larger percentage of attendance will be apparent next year even if held in July.

[Maj. E. S. BENTON, Coast Artillery Corps, commanding Fort Miley, Cal.]

The National Guard took great interest in their work and were busy all the time. There was not a single case of drunkenness or disorder in the camp.

The officers took great interest in the work and lectures.

The strongest recommendation would be the permanent assignment of militia companies by War Department to different forts and batteries so that they could study the guns

with a definite object in view, then return each year to the same guns, and the distribution of books and other means of instruction when not in camp.

[Maj. J. W. RUCKMAN, Coast Artillery Corps, commanding fire command No. 6, Fort Winfield Scott, Cal.]

The progress made by the enlisted men of the National Guard was excellent and highly satisfactory. That made by the officers was not so good, although two or three did very well and would, with study and careful instruction, make efficient officers. The difference in result between officers and men appears to be due to the simpler duties of the former and mechanical system to which these duties are reduced on the one hand, and the more intricate duties of the officer in connection with coast artillery on the other. Owing to this fact and lack of previous preparation for such duties the officers of the National Guard were extremely deficient in confidence and to a great extent helpless.

My experience during the two weeks given to this work convinces me that good artillery soldiers can be made from the national guardsmen in a comparatively short time, but much time and patience will be required to accomplish a similar result with the officers. From this it will appear that some radical measures of instruction for the officers must be taken up during the interval between annual encampments if these officers are to learn the duties that will be required of them in the coast artillery service.

[Maj. F. R. KEEFER, surgeon, U. S. Army, sanitary inspector.]

The surgeon of the Second Regiment had no organization. His equipment was incomplete and badly kept.

It is a pleasure to record, on the other hand, that the surgeon of the Seventh Regiment had an effective personnel (actually exceeding, by 4 members, the requirements of field service regulations); that his equipment was complete and well cared for, and that he and his officers and men were zealous and efficient.

The medical officers were all quartered at the main camp, leaving the minor camps unprovided with medical attendance. A better arrangement would seem to have been to have assigned a medical officer and members of the Hospital Corps to each camp or group of camps.

[Capt. H. T. FERGUSON, U. S. Infantry, commissary, The Presidio, San Francisco, Cal.]

The militia officers expressed themselves as greatly pleased with the services of the subsistence department, and their only criticism was that the quantity of the ration was insufficient, which they realized required legislation to remedy.

It is my opinion that the ration will always be found insufficient in quantity for militia and volunteer troops unaccustomed to practice the economy and plain but wholesome living of regulars. It proves the need of one of two things, an increased field ration or a service corps of army cooks trained to practice economy in army cook schools.

[Capt. L. BRECHEMIN, Jr., assistant surgeon, U. S. Army, surgeon, Fort Baker, Cal.]

The general sanitary condition of the camps was, as a rule, very satisfactory. A few minor defects were observed, such as not burning out garbage cans or keeping them all covered at all times, but these defects were promptly corrected when reported.

Both officers and men of the organizations showed a commendable desire to carry out all sanitary requirements.

[Capt. LEVERT COLEMAN, Coast Artillery Corps, district ordnance officer and assistant to Lieut. Col. Geo. F. Cooke, Twenty-second Infantry, instructor of supports.]

The regimental organization of the infantry regiments of the National Guard of California should be retained intact and each regiment of infantry should be camped as a unit under its colonel as artillery supports, supplying the artillery reserves from new artillery organizations of the National Guard raised by the coastwise cities which are protected by the batteries. In this way the regimental pride and esprit de corps of the National Guard is fostered and the only opportunity for assembling the regiments for concerted work is taken advantage of.

Infantry regiments from the interior naturally prefer their infantry work which they regard as their legitimate preparation for war, while artillery organizations of coast cities would be in a position to keep in constant touch with the regular artillery stationed near their homes, as is actually done in the case of organizations of the guard in Greater New York.

All regular officers detailed for this work in connection with the joint maneuvers should report for duty at least three weeks before the exercises begin in order to be familiar with the terrain and with all local conditions under which the exercises are to be conducted so that the detailed scheme of instruction and field work may be prepared ahead of time and strictly adhered to.

The officers of the National Guard companies showed great zeal and aptitude and the conduct of the men was exemplary.

Unfortunately the companies were depleted, due to the important agricultural interests which demand the services of the men during July.

If future exercises were held in late September or early October this difficulty would be greatly lessened, if not entirely removed.

It is confidently believed that by continuing the work so profitably begun this year the National Guard of this State will afford in time of war or other emergency a body of trained troops equal to any task which may fall to its share.

[Capt. G. A. NUGENT, Coast Artillery Corps, commanding Twenty-ninth Company, Coast Artillery Corps, and Battery Godfrey, Presidio, San Francisco, Cal.]

During the encampment I was in command of Battery Godfrey and the Twenty-ninth Company Coast Artillery Corps. Company D, Seventh Infantry, National Guard California, was assigned to this battery as artillery reserve. The enlisted men of the company after a little preliminary instruction were put into the gun detachments and position-finding service. I found them very enthusiastic and quick to learn and an excellent auxiliary to my own company.

By combining the two companies I was able to form two full gun detachments, with a substitute position-finding detail from the militia.

Nothing beyond elementary instruction was attempted, but in order that the instruction of this year be not lost it is recommended that the companies be permanently assigned to batteries as artillery reserves and that each year the reserves go to the battery to which assigned for a period of two weeks' instruction, such period to coincide with the annual encampment of the regular troops. The instruction would thus be continuous from year to year and might be supplemented at

the home stations by sending, from time to time, selected non-commissioned officers from the regular company assigned to the same battery for the purpose of giving instruction.

From this would result a bond of sympathy and acquaintance between regulars and militia which would tend toward harmony and efficiency in time of war.

[Capt. J. F. BRADY, Coast Artillery Corps, commanding mine command and Sixtieth Company (torpedo), Coast Artillery Corps, Presidio, San Francisco, Cal.]

The service of the visiting militia was entirely satisfactory. Officers and men were enthusiastic in their work and gained considerable knowledge as to their duties as artillery reserves.

The scheme for instructing militia in the manner inaugurated in this encampment seems a most profitable one, perfect harmony existing between the organizations. The militia were highly pleased with the arrangements made for their camp and, from all observations, are eager to return to similar duty in the future.

[Capt. E. A. GREENOUGH, Coast Artillery Corps, commanding Sixty-seventh Company, Coast Artillery Corps, and Battery Saffold, Presidio, San Francisco, Cal.]

The men (militia) showed great interest and zeal and were soon able to do most of the manual of the piece with but little attention from the regular detail.

A few of the brightest men of the militia company were selected and given instruction in the duties at the B' station with very good results. While the company assigned to this battery is not, in my opinion, up to the standard of some other companies of its regiment, these men would make valuable reserves to the regular artillery personnel and the scheme to create such reserve from the National Guard of the different States is certainly practicable.

[Capt. S. D. MCALISTER, Coast Artillery Corps, commanding Battery McKinnon, Fort Winfield Scott, Cal.]

The militia at drill took hold very enthusiastically, so that in a short time they had progressed far enough to put up a very satisfactory drill.

Perfect harmony existed between the State troops and the regulars during the entire encampment, and I am satisfied that the former left with the feeling that they had been materially benefited by the association.

[Capt. E. A. STEWART, Field Artillery, on duty at Battery Godfrey, Presidio, San Francisco, Cal.]

The conduct of the men throughout this movement while under my observation was excellent. There was no boisterous shouting or horseplay and the transfer was made in a quiet and orderly manner that was highly satisfactory. In camp, so far as I had opportunity to observe, the same quiet, orderly spirit prevailed and I believe these militia troops should be commended for the evidences of discipline they have thus displayed.

Great interest in the daily drills at the guns and in the range station was manifested by the officers and enlisted men under my observation at Battery Godfrey.

The relations which existed between the enlisted men of the militia and regular troops was observed to be most cordial, the former anxious to learn and the latter anxious to teach. This community of interest produced remarkable results in a short time and I believe should be encouraged in every possible way. Indeed, I was personally impressed with the practical results accomplished in the short period covered by these maneuvers and I earnestly recommend their periodical repetition.

I also recommend that the various militia companies of the National Guard of California be assigned to certain named and designated batteries comprising the coast fortifications. Suitable insignia to indicate such assignments might not be inappropriate.

The clothing supplied to the militia troops for this occasion was, I believe, insufficient in both quality and quantity. Heavier clothing and more blankets are essential to comfort in camp here.

If these maneuvers are to be continued it is believed that the facilities and camp arrangements might be made of a more permanent or semi-permanent character to advantage and without greatly increased cost.

[Capt. C. C. PULIS, Field Artillery, commanding Battery Cranston, Presidio, San Francisco, Cal.]

Company C, Seventh Infantry, California National Guard, was assigned to this battery as artillery reserve.

The men of this company assisted the regulars in every detail of working the battery and its accessories and showed

very commendable zeal in their work, proving in my mind the feasibility of using men of no training at the coast defenses with a very limited time for training and instruction.

[Capt. J. W. ABBOTT, Coast Artillery Corps, commanding Battery Lancaster, Fort Winfield Scott, Cal.]

There was no friction between the regular and militia establishments and the latter left the camp highly pleased with the treatment that had been accorded them. The men of the regular company going on guard twice during the period of the camp interfered somewhat with the instruction of the militia and it would be desirable to have the post guard done by other than coast artillery troops during future camps if it could be so arranged.

A detachment of Company B was placed in the primary station and kept there during the entire period of camp. The men of this detachment made rapid progress in learning to handle the plotting board, range board, and deflection board and some of them were immediately available as telephone men. In case of war Company B, Seventh Infantry, California National Guard, would make a very desirable reenforcement of any company of regulars manning Battery Lancaster.

[Capt. J. R. POURIE, Coast Artillery Corps, battery officer, Battery Howe, Presidio, San Francisco, Cal.]

My duties as battery officer at Battery Howe, which is regularly manned by the Tenth and One Hundred and Fifth Companies, Coast Artillery Corps, brought me into pleasant association with Companies H and I, Seventh Infantry, National Guard California, which were assigned to the battery for drill and instruction. The guardsmen showed a commendable interest in the work and so rapid was their progress that within a few days they were able to serve certain of the mortars with detachments composed entirely of their own.

I do not mean to say that their detachments were efficient, for the period of instruction was altogether too brief, but with a reasonable amount of training I am convinced that they could be made a valuable adjunct in the work of coast defense. I do not recommend the manning of guns and mortars by detachments made up wholly of guardsmen un-

til they are thoroughly trained, but I believe good results can be obtained after a slight training by forming mixed detachments of regulars and guardsmen, retaining the non-commissioned officers and privates of the former for the more important work.

[Capt. HENRY B. CLARK, Coast Artillery Corps, commanding Battery Duncan, Fort Baker, Cal.]

Considerable assistance would have been rendered the militia if a regular officer had visited each armory and talked over the situation a few weeks before the camp.

Fatigue clothes should have been issued to the militia.

Officers of the militia should be authorized to make clothing purchases of the quartermaster department.

Provision should be made for paying those men of the militia who may be able to attend only a portion of the camp. The impression prevailed among the militia that a man must arrive and depart with his company.

It would be better to have the men in camp part of the time than not at all.

[Capt. MALCOLM YOUNG, Coast Artillery Corps, commanding Batteries Springer and Livingston, Fort Miley, Cal.]

Company H, Second Regiment, National Guard of California, was assigned to pit B, Battery Springer. This company took a keen interest in their work from the beginning to the end of the maneuvers and in every way attempted to gain all possible knowledge and skill in connection with the service of a mortar battery.

The interest shown by the companies of infantry supports would lead me to believe that all of the companies would have profited to a great extent if they had been assigned as reserves rather than infantry supports.

[First Lieut. GRAHAM PARKER, Coast Artillery Corps, commanding Battery Chamberlain, Fort Winfield Scott, Cal.]

With a view to improvement in future exercises I would suggest that service practice be held during the encampment at all batteries to which militia companies are assigned.

[First Lieut. JAMES B. TAYLOR, Coast Artillery Corps, range officer, Battery McKinnon, Fort Winfield Scott, Cal.]

The militia organizations assigned to Battery McKinnon did good work. A complete detail was used in the primary station and after a few drills was able to furnish data to the pits quite rapidly and accurately. These men showed great interest in the handling of the various instruments.

[First Lieut. G. B. G. HANNA, Coast Artillery Corps, battery officer, Battery Chamberlain, Presidio, San Francisco, Cal.]

In compliance with verbal instructions from the adjutant, Presidio, San Francisco, Cal., I was on duty the 5th and 6th instants in Oakland, Cal., meeting the State militia and directing them to their stations.

The detraining of the incoming militia, especially that of the Seventh Regiment, was conducted in an orderly and systematic manner and as quickly as possible under the circumstances, but on account of their late arrival they were very late in getting to the Presidio with their baggage.

I respectfully recommend that in case of future encampments the train schedules be so arranged that the troops will arrive here early in the day in order to give them time to make camp and get settled before dark. Company K of the Seventh Regiment, assigned to and camped at Battery Chamberlain, took a great deal of interest in and learned the artillery drill very quickly. They were orderly, well behaved, and apparently anxious to learn.

[First Lieut. C. E. BRIGHAM, Coast Artillery Corps, adjutant, quartermaster and commissary, Fort Miley, Cal.]

As post quartermaster the following facts came to my attention:

Two companies (H and I, Second Regiment Infantry, National Guard California) arrived at this post at about 6 p. m., July 5, 1907, without baggage of any kind.

The captains of these two companies stated that the railway company refused to take their property as baggage and that they were forced to ship it as freight.

In view of the trouble and inconvenience to which these two companies were put it is suggested that in future movements of State troops to and from these joint exercises, agreement should be made with railway companies to have com-

pany baggage shipped as baggage and company commanders should be instructed to insist on having their company's baggage allowance transported in the baggage car.

It is thought that instructions to State troops on shipment of property should go into details as much as possible.

As Adjutant it came to my attention that the officers of the militia organizations were not familiar with military paper work of any kind and were unable to prepare the papers which it was necessary for them to submit, such as pay rolls, morning reports, ration returns, vouchers for meals purchased en route, etc.

It is suggested that it would save considerable time and trouble if they could gain some familiarity with such paper work as will necessarily fall to them. This might be accomplished in a number of ways, one of which would be to have models printed and furnished to company commanders through the adjutant-general of their State.

As Commissary it came to my attention that nearly all of the militia companies exhausted their rations before the end of the period for which they had been rationed. While this of course was to be expected and was due to some extent to unavoidable causes, yet it is thought it was principally due to the poor handling of the ration.

The contrast between the meals of the regular companies and those of the militia companies was too evident.

If some instruction in the handling of the army ration could be imparted to cooks of militia companies, it would be of the greatest value to their organizations.

[First Lieut. THOMAS A. JONES, Coast Artillery Corps, commanding Battery Yates, Fort Baker, Cal.]

I should recommend the month of September for future encampment for many and obvious reasons, and that in future encampments the reserve be permitted to fire a few rounds of service ammunition, when in the discretion of the fire commander they have attained a sufficient degree of proficiency in the manipulations of the guns and the material with which a battery is equipped.

[First Lieut. H. A. BRYANT, Coast Artillery Corps, commanding Battery Kirby, Fort Baker, Cal.]

During the maneuver period I acted as range officer and battery commander of Battery Kirby.

RECOMMENDATIONS.

1. That these maneuvers be held later in the year inasmuch as the month of July, on account of the frequent fogs, seems unsuitable.

2. That a gunnery class to meet daily for a period not to exceed one hour be formed of militia noncommissioned officers and selected privates and be instructed in the elementary principles of gunnery by an officer or noncommissioned officer of the regular establishment.

[First Lieut. WM. S. CARPENTER, Coast Artillery Corps, Battery Kirby, Fort Baker, Cal.]

I was especially impressed by the character of the men and officers of this company—Company B, Fifth Infantry, National Guard California—the interest they took in the work, and the rapidity with which they learned the drill, the working of the guns, use of materials and the principles of gunnery. They were full of questions and the men of the Sixty-eighth Company vied with each other in answering those put by the men of Company B.

The national guardsmen came to camp with one suit of khaki per man and within a few days these clothes in nearly every case became soiled and greasy and therefore I would recommend that in the future for similar occasions canvas fatigue clothes be furnished them by the State or Government.

I would recommend that the State be encouraged to organize coast-artillery troops and that the companies be assigned permanently as reserves to batteries at their home stations and that the officers and men be encouraged to visit these batteries at all times and participate in all drills possible, especially the service practices.

They could attend night drills quite easily and in their armories in addition to their infantry work they could receive the same instruction given to the enlisted men in the Coast Artillery at present.

I would also recommend that these encampments be held often and be at such times in California as would permit a greater attendance of the National Guard, either in the spring or fall.

I would also recommend that the camps be of only one week duration, for the same reason, because very few men in

business and in the trades can get more than one or two weeks' vacation in a year, part of which every married man would prefer to spend in the country with his family.

I would also recommend that more ammunition (subcaliber and service) for target practice be allowed the National Guard and that records of their target practices be kept and published, as it would stir up considerable competition and more interest in the work.

[First Lieut. GUY E. MANNING, Coast Artillery Corps, Battery Duncan, Fort Baker, Cal.]

Company M, Fifth Regiment, National Guard California, was assigned as the reserve company at Battery Duncan. The officers and men very quickly acquainted themselves with their various duties and were at all times ready to perform any duty that was imposed upon them.

I noted with pleasure the manner in which the enlisted men of the National Guard and the regular soldiers fraternized with each other from the beginning to the close of the encampment. There was never the slightest friction.

For the best interests of the service and owing to the inability to secure trained men in artillery work in time of war I would recommend frequent encampments such as we have just had.

[First Lieut. J. E. ABBOTT, Signal Corps, U. S. Army, instructor of California Signal Corps detachments, Presidio of San Francisco, Cal.]

The work of the Signal Corps was somewhat limited, but satisfactory results were obtained from what was done.

The duration of the maneuvers being about eleven days it was impossible to devote much time to the details of all the work of the Signal Corps in the field. During the first week I took charge of the line construction and operation of field lines for use of troops in the field and was accompanied by the officers of the militia Signal Corps who readily took hold of the work and seemed to be much interested in the instruction given. The men of my detachment accompanied the squads of militia Signal Corps and assisted them when necessary and explained the use of a few of the modern instruments now operated by the Signal Corps in maintaining lines of communication in the field. The men in these companies, some of whom were telegraphers and electricians

and a majority visual signalmen, displayed a degree of intelligence of the work to be performed that was above the average of the State Signal Corps troops being under my observation and instruction in the past.

From my observations of the maneuvers just ended I would make the following recommendations:

That a special Signal Corps umpire be detailed whose duty it will be to report on the efficiency of the Signal Corps to furnish and maintain proper lines of communication and failure of the commanders to make use of the lines of information.

That the material and instruments for the performance of the duties of the Signal Corps under all conditions of climate, weather, and terrain, as would be presented in actual warfare, be complete in every detail.

[A. V. STEPHENSON, C. S., U. S. Army, post surgeon, Fort Miley, Cal.]

The members of the militia command being from the warmer sections of the State were more prone to disease than the members of the companies of coast artillery stationed here but no serious cases resulted.

All camps were well policed and kept in an excellent sanitary condition and an inspection of all camps, kitchens, sinks, latrines, and grounds was made twice daily.

The food was of best quality and sufficient in quantity, the men being well satisfied.

During the entire period of encampment the health of the command was very good considering the great change of climate to which the men were subjected and the sleeping in tents, which a greater part of the time were damp owing to the constant fog and mist, and I would recommend that the future encampments be held during the months of April, May, or the first part of June, as at that time the conditions of weather on this coast are much more adapted to outdoor maneuvers than at any other time of the year.

INSTRUCTORS OF SUPPORTS.

[Lieut. Col. GEORGE F. COOKE, Twenty-second Infantry, U. S. Army, Presidio, San Francisco, Cal.]

Troops for the artillery reserves should be furnished by the coast cities which are to be benefited and protected by

the coast fortifications in time of war. Each such reserve company should be permanently linked with a regular organization at a battery of the permanent coast defense.

The National Guard quartermasters, except the camp quartermaster (selected for past experience and ability), should be assigned during certain hours daily to receive instruction in paper work and actual quartermaster's business from the post quartermaster.

The same applies to the National Guard commissaries.

Careful instruction in reports, returns, use of blank forms, etc., should be given all adjutants and company officers.

The conduct and bearing of the National Guard troops assigned to the artillery supports was exemplary. They displayed great zeal in their work and aptitude in adapting themselves to the simulated war conditions. Their work was excellent and demonstrated the fact that by continuing the joint exercises so successfully begun in a very short time the National Guard of this State (California) will be able to furnish a trained body of men equal to any task which the emergency of war may demand.

[Capt. J. P. RYAN, Sixth Cavalry, U. S. Army, Presidio of San Francisco, Cal.]

Referring to that part of General Orders, No. 21, War Department, 1907, which directs recommendations or suggestions looking to improvement in future exercises, I have the honor to suggest that regular officers selected for duty with the National Guard troops acting as artillery supports be notified sufficiently in advance and an outline of the work expected of them be furnished in time to permit them to make preparations for same. I would also suggest that a frame building, well lighted and large enough to seat about 100 officers, is needed near the camp for assembling the officers in the evenings for discussions, lectures, etc.

[Capt. GEORGE D. MOORE, Twentieth Infantry, U. S. Army, Fort Miley, Cal.]

At the inspection on July 13 the following points were noticed:

Uniform dress: Clean and fairly well fitting.

Arms and equipment: Not very well cleaned; this corrected later.

Drill: Greatly improved over that at the beginning.

Discipline was excellent, orders were generally well carried out, and the enlisted men did whatever was required of them cheerfully and apparently to the best of their ability.

There was considerable variation in the amount of training of the different companies but all showed great improvement before the end of the maneuvers. These four companies, I, K, L, and M, Second Infantry, had never before been together as a battalion; their improvement in battalion drill under their commander, Major Bond, was most marked.

The majority of the officers took a decided interest in the work laid out for them and profited by suggestions and their own mistakes.

Many have read military works and needed only interpretation of them.

[First Lieut. J. A. Moss, Twenty-fourth Infantry, U. S. Army, Fort Winfield Scott, Cal.]

All officers seemed interested, worked, and were willing to learn.

Some of the officers of the State Adjutant-General's Department outlined the following scheme to me verbally in regard to deficiency in elementary tactics of their officers:

(a) That a comprehensive and uniform system of study and instruction be carried on throughout the year—such instruction as would enable them to properly read maps, understand and frame orders, elements of tactics, etc., with a view to getting rid of some of the inefficiency at maneuvers and to enable them to take the examination and be listed by the War Department as available officers in case of war.

(b) That an officer on the active list be detailed by the War Department as instructor of militia of California with station in Sacramento to be on duty in the State Adjutant-General's Department.

(c) That this officer outline a comprehensive system of instruction to be carried out throughout the year.

(d) That this instruction be outlined by mail from the State Adjutant-General's Department and carried to completion by the regular officer visiting each armory once every three months as instructor, remaining a week at each place.

From my own observation I would recommend that in future officers detailed to attend the exercises from the Reg-

ular Army be assembled to outline a definite plan for the exercises of infantry supports cooperating with troops on duty with the artillery about one week before the encampment begins.

[First Lieut. L. M. CASS, Twelfth Cavalry, U. S. Army, Fort Winfield Scott, Cal.]

In my opinion the maneuvers were a success and the continuation of them will result in a great good to the service generally.

While I do not feel competent to say just what improvements could be made over the present scheme of combined maneuvers under existing laws, I am of the opinion that if companies or regiments could be organized and maintained as a part of the organized militia of the State, whose duties would be that of support to and reserves for the regular artillery force, a great amount of good would result to the service from such organizations and they would supply a very much needed reserve in time of war.

[First Lieut. WM. B. GRAHAM, Twentieth Infantry, U. S. Army, Fort Baker, Cal.]

RECOMMENDATIONS.

That the target ranges at the different posts where these exercises take place be placed at the disposal of the militia and that they be authorized to use all spare time in target practice.

A higher state of discipline should be sought for by the militia among both officers and men. Every means should be taken to impress on militia officers that excellence in physical training and rifle practice should be their chief object.

In conclusion, I wish to report that the personal relations between all regular and militia officers and men were most congenial and our work was conducted in perfect harmony throughout; the keenest and most careful attention was paid by the militia officers to all theoretical and practical instruction and a creditable amount by the men. The practical work in "minor tactics" and "hasty intrenchments" by the supports was particularly commendable.

[Second Lieut. R. E. BEEBE, Twenty-ninth Infantry, U. S. Army, Fort Winfield Scott, Cal.]

If officers are to be sent to maneuvers they should report in advance and assist in planning the instruction work and become acquainted with the coming problems and needs of the National Guard troops.

After considerable discussion of the National Guard problem with reference to the coast artillery I am convinced that infantry regiments should not be detailed as artillery reserves.

It is useless to hope that our National Guard can devote the necessary time to learn to be both infantrymen and coast artillerymen.

A movement should be begun at once to induce the State of California to organize coast artillery companies in San Francisco; these companies to be made to feel at home with the batteries they would reinforce in time of war. The California infantry should be trained only in the land defense and other infantry problems. If the present scheme is continued only poor National Guard infantry can be expected and long absence from the guns can hardly create other than poor coast artillerymen.

The method of instruction this year has been to train the minds of the National Guardsmen in military duties and not to strain their physical endurance at the same time. This method has been so successful that it is recommended for the future.

In closing I wish to remark that I have myself been a member of a National Guard organization and recognize the difficulties with which they have to attend. The National Guard of California is very fortunate in its men and officers. That its companies are not larger is its only drawback.

The sacrifices which the personnel make and the interest and eagerness which they display in military duty are very creditable to the State of California. The people of the State may well be proud of them and should rally to the needs of the guard. The Regular Army is fortunate that it has such a second line for war.

[Second Lieut. WALTER C. SHORT, Twenty-fifth Infantry, U. S. Army, Fort Winfield Scott, Cal.]

The numerous mistakes in the pay rolls and the absolute disregard of instructions thereon lead me to suggest that

before the troops are mustered all officers should be assembled and a short talk given on the preparation of the rolls, and the importance of all officers giving their personal attention to reports, returns, etc., should be impressed upon their minds.

[Second Lieut. CLARENCE A. DOUGHERTY, Thirteenth Cavalry, U. S. Army, Fort Winfield Scott, Cal.]

The work of the National Guard was in the main extremely gratifying. Their officers were apparently well up on their duties before coming here and were ready, willing, and anxious to take advantage of every opportunity to learn anything concerning their duties.

The relations between all the regular officers on duty with the militia and the militia officers was extremely cordial and throughout the encampment there was not the slightest friction.

If students from the Infantry and Cavalry School (now Army School of the Line) are to be detailed to assist in the instruction of similar encampments in the future, I would like to strongly recommend that they be detailed a week or ten days ahead of the encampment, so as to have time and opportunity to become thoroughly familiar with the terrain and all its possibilities previous to the encampment. Much more efficient and instructive service can undoubtedly be given by student officers from Leavenworth if given an opportunity to map the terrain and examine into all its possibilities previous to the actual assembly of troops for exercises on the same.

My services with the militia at Fort Winfield Scott were very pleasant indeed to me as well as very instructive.

COMMENTS OF MILITIA OFFICERS.

[J. B. LAUK, adjutant-general of California.]

The method of furnishing transportation direct to company commanders was not a success and often resulted in confusion, as transportation greatly in excess of what was required was furnished some organizations and none whatever to other organizations. A much simpler and more satisfactory method would be to furnish regimental quartermasters with transportation requests sufficient for each regiment and hold them responsible as they are under bond to the State.

While the keenest interest in the exercises was manifested by both officers and enlisted men of the militia and the interest taken by the officers and men of the Coast Artillery did much to bring more closely together the Army and the militia, yet I can not but believe that the scheme is impracticable in so far as this State is concerned, as it is exceedingly difficult to train infantry organizations in their own branch without adding thereto the duties of coast artillery reserves. It may be argued that the coast States should change their organizations from infantry, etc., to coast artillery, but in this State this would be entirely impracticable because, while officers and men were interested and pleased with the work at the recent joint exercises, yet should the organizations be changed to coast artillery, officers and men would soon realize that in the event of war they would be obliged to man the coast fortifications and might perhaps see no active service whatever, while those serving in the other arms would undoubtedly see much service and as the prospect of active service at some future time is the principal inducement for enlisting in the National Guard of this State, therefore if the prospect of active service is withdrawn I fear that it will be impossible to maintain the organizations even at a low minimum. For these reasons I am constrained to a disapproval of the idea of organizing the troops of this State as a coast artillery reserve or using them in that capacity at future maneuvers.

It is my opinion that coast artillery reserves should be organized from those living near the coast defenses and controlled by the War Department.

[Lieut. Col. W. G. SCHREIBER, assistant adjutant-general, First Brigade, National Guard California.]

An officer's mess was established, the Quartermaster's Department, U. S. Army, furnishing the necessary cooking utensils and tableware. The cooks were detailed from the post cooking school, and received extra compensation of \$1 per day each. The mess was in charge of Capt. F. C. Prescott, jr., commissary, Seventh Infantry, and was very successful.

The health of the officers and men was exceedingly good and when it is considered that all came from localities with a very warm climate and that the weather at the Presidio was

exceedingly foggy and cold it speaks well for the general physique of the members of the guard.

The Commissary Department, U. S. Army, issued the regular field rations on ration returns made by company commanders, but these returns were not consolidated nor checked up and approved by anyone. The rations, as usual with National Guard companies, were not sufficient to satisfy the men, although in some cases very little was bought to fill out; but companies who had a company fund spent liberally to purchase extras. My observation was that in all cases the rations were fairly well used and the kitchens very neatly and cleanly kept.

From conversation with officers of the Coast Artillery Corps it was learned that they were unanimous in their praise regarding the intelligent and willing manner in which both officers and men performed their several duties and the splendid discipline exhibited by the men. It was particularly noted that only a very small percentage of the officers and men left camp at any time and that no evidence of the use of intoxicating liquor was noticed among the men.

I cannot say too much for the marked courtesy shown the officers and men of the guard by both officers and men of the Army. Not a single instance of superciliousness was noticed and the promptness with which all enlisted men of the Army recognized the presence of an officer of the guard should make a lasting impression on the members of the guard.

Not wishing to detract in the smallest degree from the good effect these exercises had on the guard, it is a serious question in my mind, and one the discussion of which I approach with a good deal of uncertainty, whether these joint coast defense exercises are really beneficial to the infantry branch of the guard.

As the companies are so widely scattered throughout the State as to make even a battalion drill almost prohibitive, all field officers look forward to an encampment, at which time they may have an opportunity to command their respective organizations and when this is denied them, where their companies are detailed to batteries, their usefulness as field officers is considerably curtailed in so far as experience in handling men is concerned. The infantry has so much to learn of their own branch of the service, and of which they

know so little, that it would seem to be more for the good of the service if they were confined to that branch in the endeavor to make them more useful as infantry. It is true that any officer or man who intelligently applies himself to any service in which he finds himself can obtain knowledge that makes him a better soldier, but what the infantryman needs is infantry instruction in field work and the only time he can learn that is probably once a year, and not always then, at an encampment, and when the infantry is used as coast artillery the only chance to learn his branch of the service is denied him.

The scheme of the War Department no doubt was to ascertain if the National Guard could be used as artillery reserves and I think this has been conclusively proved to the satisfaction of all concerned, but what the infantry is principally for is to learn to fight as infantry and not as artillery. It would seem to me that having satisfactorily demonstrated that the guard is composed of men that are intelligent enough to be used as coast artillery the infantry might properly be allowed to revert to their original status as infantry and should be given all possible encouragement to make them perfect in that branch.

Some companies of the First Brigade have discussed the advisability to take up coast artillery drill. This should not be permitted, as all the time they can spare should be given over to perfecting themselves in their own branch and all realize that they need it bad enough. It would perhaps be a good scheme if coast artillery companies were organized in places such as San Francisco, San Diego, etc., but infantry organized as such should not be encouraged to take up any other branch of the service as at present they have all they can do to turn out as infantry.

[Col. S. H. FINLEY, commanding Seventh Regiment, National Guard of California, Fort Winfield Scott, Cal.]

After a careful survey of the movements and the exercises connected with the maneuvers I have the following suggestions to offer, which I believe would increase the benefits to be derived by the regiments in maneuver camps of this character given hereafter:

The transportation of regiments should be left, so far as practicable, with the regimental quartermasters; this, I be-

lieve, would relieve the depot quartermasters at San Francisco of unnecessary work, it would relieve the regimental commander from uncertainty as to the arrangements for the transportation of the several companies of his command, and would avoid the confusion occasioned during the recent movements of troops by some company commanders receiving no transportation and others receiving too much. If these suggestions should be carried out it would enable the regimental staff officers to gain experience of their duties in the very important work of transporting troops, which I assume is one of the objects sought to be obtained by the camp of instruction.

Much valuable instruction and experience have been gained by myself and my command from the tour of duty and from the courtesy and painstaking attention of the regular officers and men and I take this opportunity of expressing my very great appreciation of the same. I hope that the friendship that has arisen between the officers and men of the regular service and those of the organized Militia may result in much good to both.

[Lieut. Col. S. M. SALTMARSH, Seventh Regiment, National Guard of California, Fort Winfield Scott, Cal.]

Admitting as a fact the necessity for having available as a coast artillery reserve troops of the National Guard the question then is as to what are the best means to obtain such troops and give them the necessary instruction to make them available for the duty which they may be called upon at any time to perform. National Guard drawn from interior towns and cities for a brief space each year for instruction in coast artillery work can not be expected to acquire even a reasonable degree of proficiency in that branch of the service. The reasons for this are very plain and of such weight as not easily to be overcome.

1. There is no opportunity between periods of encampment to give practical instruction, as neither officers nor men would have opportunity to visit coast fortifications for the purpose of receiving instruction.

2. The personnel of the National Guard changes very rapidly and unless opportunities for more or less continuous instruction in that service is afforded the instruction given dur-

ing short encampment periods must of necessity be looked upon as sporadic and not of lasting benefit.

3. The regiments, battalions, and companies of the State troops located at interior points are organized for, and do have opportunity for, continuous instruction in work along the line of their service as infantrymen. In this branch of the work they would be most capable of rendering good service in time of war. Therefore it is believed that such National Guard forces as are to be considered as available for artillery-reserve duty should be organized in those cities and towns upon the coast line and at which coast-artillery fortifications have been erected. It is a matter of vital importance to the city of San Francisco to have maintained the integrity and effectiveness of the coast-artillery fortifications which guard the entrance to its bay.

It should as well be a matter of pride for that city to organize, discipline, and maintain its proportion of the State troops of California as a coast-artillery reserve.

There is no question but what more satisfactory results could be obtained by the organizing of such troops in San Francisco where they have opportunity from day to day and week to week of securing practical instruction in coast-artillery work because of the easy accessibility of the regular troops and fortifications.

The very marked and earnest endeavor of the officers of the Regular Army of all arms of the service to assist National Guard officers in every way to acquire a better knowledge and understanding of the profession of arms was the most greatly appreciated feature of the maneuvers and it can not result other than in arousing the enthusiasm and interest of all National Guard officers who were present during the tour of duty.

[Maj. LOU BOND, Second Regiment, National Guard California, Fort Miley, Cal.]

The camp has been in my judgment a success from a National Guard view point. The work has not overburdened the officers nor men.

All officers and men, without exception, have taken great interest not only in the maneuvers but in the artillery instruction and practice in handling the guns, and the general results have been good.

The officers and men have exercised the utmost attention in matters of instruction at the hands of the officers and men of the regular service and every kindness and courtesy has been extended them.

There is undoubtedly a closer feeling and friendship between the Army and the Guard as a result of the joint camp.

I would mention particularly that Major Benton, the post commander, and Captain Moore, Twentieth Infantry, U. S. Army, with whom I have personally come in contact with more than the others, have spared no effort to make the camp both pleasant and instructive. The same may be said of the other officers.

If camps of this character are to be an annual occurrence I believe that it will be better that the National Guard be in part organized into coast artillery companies and assigned to the same forts each year. They can then study coast artillery literature.

[Maj. M. W. SIMPSON, Fifth Regiment, National Guard California, Fort Baker, Cal.]

After realizing for the first time the extensive scale of the fortifications of San Francisco Harbor I would urge upon all to whom these presents may come the necessity of converting some of the present infantry companies of militia about the bay into an organization of coast artillery for occasional gun drills in the fortifications as well as infantry drill at home. It seems a great lack of preparation that in case of war there should be but a handful of men available, as would be the case, to man guns which the Government has installed with unsparing expense to protect the harbor.

The schedule of exercises laid down by the artillery district commander was closely followed. Patrol, outpost, and entrenchment duty was supervised by First Lieut. W. B. Graham, Twentieth Infantry, U. S. Army, who also conducted an officers' school on the evening preceding each day's work and who developed and illustrated by field work a course in field and road mapping.

The practice of assigning an officer of the regular branch to the militia organization is of infinite benefit and Lieutenant Graham, besides covering fully within the limits of time the

subjects given him, was of great assistance to myself and officers in matters of internal administration.

I think it proper to state that the men were orderly and under good general discipline and so far as I can learn performed the work with unusual interest and zeal.

[Maj. TRUMAN COLE, Seventh Infantry, National Guard California, Fort Winfield Scott, Cal.]

I think the camp was the most instructive camp we have ever had and would respectfully recommend one for next year, but would suggest that companies be assigned so that the majors could be assigned to fire commands to which their companies belong.

[Maj. L. L. VESTAL, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

I respectfully suggest that at the camps in the future held on this same plan each battalion be held intact.

For instance, three of the companies in my battalion were in the batteries and one in the artillery supports. This one company feels that they did not have the advantages to learn that the other companies of my battalion had. I mean by this that if any companies go in the batteries that all four companies go, and if any be held in support all four companies be held in support.

Also that the staff officers be permitted to assist in the line of work for which they are appointed, such as quartermaster or commissary officer.

[Maj. FRANCIS M. BRUNER, surgeon, Seventh Infantry, National Guard California, Fort Winfield Scott, Cal.]

The sanitary condition of the camp was good; some minor defects, such as having latrines covered completely by the framework outside and vents screened. Also seats should be covered at all times to keep flies out.

The general health of the officers and men was good.

[Capt. O. W. SPEARS, commanding Company C, Second Regiment, National Guard California, Battery Chester, Fort Miley, Cal.]

States the encampment was the most beneficial ever held and thinks those encampments should continue annually. All men serving an enlistment in the Regular Army or National Guard and known to be good citizens in every re-

spect should be placed in a national reserve and paid according to rules governing same in order that in time of war this reserve could be relied upon.

[Capt. G. L. HOLTUM, commanding Company B, Fifth Regiment, National Guard California, Battery Kirby, Fort Baker, Cal.]

At all times during this encampment the relations existing between the regular soldiers and the members of my company were most pleasant, and much valuable information was imparted by the members of the Sixty-eighth Company, who were always willing to assist the members of my company in all matters pertaining to the guns, the drill, uses of the different parts, etc.

To Lieut. William T. Carpenter, of the Sixty-eighth Company, the officers and men of my company are much indebted for numerous courtesies, and to him is due in a great degree the success of the work at Battery Kirby.

In conclusion I would like to recommend that some date other than the month of July be chosen for future encampments of this nature or, in fact, for any encampment requiring the presence of my company.

I would also invite attention to the fact that the ration issued is entirely inadequate to feed men of the militia attending these encampments where the men, for the time being, have appetites from one-half to probably double the normal.

The men of my company are, to a man, highly pleased with the encampment, and I believe that another such encampment in the future, should we be assigned to the same fort and same battery, would result in a much larger attendance, especially if set for a date suitable to the men's needs as explained earlier in this report.

[Capt. NEWELL VANDERLIP, commanding Company D, Fifth Regiment, National Guard California, on duty at Battery Yates, Fort Baker, Cal.]

I have attended many camps of instruction, and in none of them have I noted such a preparation for the reception, entertainment, and instruction of the militia such as the authorities at Fort Baker have afforded in the past sixteen days. The extreme courtesy and attention shown to all visiting militia men, irrespective of rank or position, and the strict observance of military requirements in rendering assistance

and instruction to the militia is deserving of the highest commendation to Colonel Slaker and the men of his command.

The extreme attention and assistance rendered my men by the Sixty-first Company has resulted in getting them deeply interested in coast-artillery work and eager to repeat the experience next year, which is in marked contrast with the sentiment prevailing after the Atascadero maneuvers of 1904.

In conclusion I would respectfully state that in my judgment the encampment at Fort Baker has been an unqualified success except in point of numbers in attendance, which can be remedied by a consideration of the proper time to hold the exercises. I am satisfied that the militia have returned home much benefited by the instruction given, greatly interested in coast-artillery work, and firmly decided to return at the first opportunity offered, all of which is in a large measure due to the extreme pains taken by Colonel Slaker and his officers to engender such a spirit in militia circles and in which he has admirably succeeded with this battalion of the Fifth Infantry.

[Capt. ANDREW J. COPP, Jr., commanding Company A, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

We arrived at Battery Blaney about 7 o'clock p. m. and were met by Captain Brady, who extended to the members of my command every possible courtesy and offer of assistance, with the result that our encampment was most enjoyable, and the harmony existing between the members of the Sixtieth Company, Coast Artillery Corps, and Company A, Seventh Infantry, National Guard California, was matter of observation.

The instruction of Captain Brady was so efficient and thorough that the men found little difficulty in understanding the theory as well as the operation of the instruments used for the purposes above named.

The branch of the work which I will venture to say was the most interesting to our men was the instruction to the men in the matter of laying and operating mines.

All arrangements were admirably conducted and no accidents occurred to mar the encampment.

The members of my command enjoyed perfect health.

The camp was most favored, being located out of the fog and strong wind. The officers and men are all agreed that the camp was the most instructive and at the same time the most enjoyable of any that Company A has ever participated in.

In conclusion I desire to express the greatest appreciation for the especial interest taken in the members of Company A, Seventh Infantry, National Guard California, by Capt. James F. Brady, Coast Artillery Corps, commanding Sixtieth Company, Coast Artillery Corps, and for the able and conscientious manner in which he conducted the instruction prescribed which has the result of imparting to my command much valuable information, thereby fitting Company A to perform coast-artillery reserve duties and infantry duties at the pleasure of the State or Government.

[Capt. A. C. F. DEE, commanding Company C, Seventh Regiment, National Guard California, Battery Cranston, Presidio, San Francisco, Cal.]

We arrived at the camp ground near Battery Cranston at 7.30 p. m. July 6 and were met by Capt. Charles Pulis, in command of the Twenty-seventh Company, Coast Artillery Corps, and were shown every courtesy possible by him; as the hour was late and no rations had been issued Captain Pulis ordered his cook to prepare supper for our men, after which the members of the Twenty-seventh Company got some lanterns and helped our men to put up the tents.

I believe this was the best camp I ever attended; the men all paid strictest attention to every detail of the work, and the men of the Twenty-seventh Company, Coast Artillery Corps, seemed only too anxious to teach our men every little detail on the guns.

I believe that another trip to the same place next year would be of great benefit to the members of the National Guard, thus giving the Army a reserve that could be put in service in a very short time should necessity require it.

[Capt. CHARLES W. LEHR, commanding Company G, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

The men of Company G were very much interested and the men of Battery William McKinnon were very gentlemanly and it seemed to be a pleasure for them to explain everything

and answer all questions the members of Company G wished to ask.

Each afternoon a lecture was held at some convenient place, several of which the officers of Company G attended, which proved very instructive.

The company had a very instructive and enjoyable camp, and as commanding officer of Company G I wish at this time to extend the thanks of the officers and men of Company G to the officers and men of the Artillery District of San Francisco, and especially to the officers of Battery William McKinnon, for the very courteous treatment the officers and men of Company G received from them and hope that in one year Company G may be allowed to take up the work where they left off this year.

I also hope the camp next year will be at least thirty days and if it could be so arranged would ask that the Government place a gun such as we used this year where Company G could drill once a week, or at least twice a month. A gun that was of no more use to the service could be used to drill with.

[Capt. G. C. GARDNER, commanding Company H, Second Regiment, National Guard California, Battery Livingston, Fort Miley, Cal.]

Captain Young and the enlisted men of his company were always interested in Company H and gave us all instruction in their power.

The men picked up the work very quickly.

I would suggest that in the future the encampment of the National Guard of California be held between May 15 and June 15 each year and that all the companies be assigned to the reserves and that the supports have a separate encampment.

[Capt. CHARLES T. HUTCHINS, commanding Company I, Seventh Regiment, National Guard California, Battery Howe, Presidio, San Francisco, Cal.]

The work and instruction at the mortar battery (Battery Howe) was very interesting and I think the battery commander used the time to the very best of anyone's ability and gave more practical instruction than I thought possible by any person in so short a time.

The men of this company were very much pleased over and interested in the work for which each man was assigned.

As far as camp discipline and regulations for the conduct of both men and officers are concerned I should recommend more of it, as National Guard officers and men have too little of this at home and are too prone to get ideas that are not at all military.

If such camps as this are to be held every year I should recommend that the infantry be done away with and make artillery companies out of such companies as are to be used as such, as the amount of work assigned to us at such a camp does not tend to better our rating when it comes to our annual muster and inspection at all.

[Capt. A. B. AUSTIN, quartermaster, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

I was able to attend most of the lectures given at ordnance storehouse and to spend some little time each day at Battery McKinnon, where, through kindness of Lieutenant Taylor on duty there, was able to gain much valuable information regarding mortar batteries.

The officers detailed at Marine Hospital camp were very painstaking and too much can not be said in their praise.

RECOMMENDATIONS.

1. That in moving a National Guard regiment the colonel and quartermaster be instructed at least twenty days before hand, taking up all necessary details of the matter, thus giving the quartermaster time to communicate with company commanders which, in our case, are scattered all over southern California.

2. That regimental headquarters be placed where the greatest number of companies are assembled.

3. That quartermasters receive a special course of instruction in their own department; that they be assigned to a quartermaster whose duty it will be to see that they are made to be perfectly familiar with all blank forms used in this department.

[First Lieut. L. M. FARRELL, Company B, Fifth Regiment, National Guard California, with artillery reserves, Fort Baker, Cal.]

During the encampment the officers and men of the militia were treated with the greatest consideration and given every

assistance in their work by the officers and men of the Regular Army.

I believe that our men like the work and would be glad to be sent back to the same station next year.

[First Lieut. ROBERT J. JOHNSON, Company D, Fifth Regiment, National Guard California, with artillery reserves, Fort Baker, Cal.]

On Wednesday morning I reported with the supports for instruction.

Lieutenant Graham, Twentieth Infantry, U. S. Army, took the supports out back of Sausalito, where they were shown in detail outpost, picket, road sketching, map reading and making. Lieutenant Graham gave us as much instruction during the day as I learned in two weeks at Atascadero maneuvers.

I attended the lectures delivered by the various officers on different subjects; they were very interesting and instructive.

I would respectfully recommend that still more of this work be given at future encampments.

I desire to express my appreciation for the courteous treatment shown me by the officers and men of the Coast Artillery Corps at Fort Baker, also the friendly relations brought about between the regulars and the militia.

Lieutenant Jones and his company of the Sixty-first were at all times anxious to assist my company in any work and made it very interesting during the camp. We feel very grateful for the chance offered to be assigned with such an organization as the Sixty-first Company.

In closing my report I would respectfully suggest that the time for a joint encampment, if such is held next year, be set the latter part of August, as in that time of year more of our men could leave their business with less sacrifice. Also, in this connection, that the respective companies be notified at an earlier date as to the time and fort assigned.

[First Lieut. T. V. BUTTS, Company E, Fifth Regiment, National Guard California, with artillery reserves, Fort Baker, Cal.]

GENERAL OBSERVATIONS.

During the entire encampment special provision was made by the officers and men of this post for the comfort and instruction of both officers and men of the militia and was responded to with enthusiasm.

RECOMMENDATIONS.

That camps of this character be had yearly, at such times as is most convenient for the militia to attend.

[First Lieut. EDWIN A. MERWIN, battalion adjutant, Seventh Regiment, National Guard California, Fort Winfield Scott.]

The regular officers were very considerate and did everything possible to furnish the officers of the National Guard with any information solicited.

Regarding instruction received from lectures delivered at the several officers' meetings, these lectures were instructive and very decidedly interesting, especially those pertaining to and describing projectiles, submarine mines, mining and torpedoes, and the range finder.

Also the forenoon spent in visiting the different batteries in company with the regular officers was of great value, having the guns and their workings explained in detail.

The camp was in a good location, fairly well sheltered, and was kept clean and sanitary.

During encampment, from what could be learned by visiting the different organizations, rations were issued in plenty and of an excellent quality.

UMPIRES, ETC.

The plan of having a number of the officers of the Regular Army scattered among the different State organizations during the exercises for instruction as well as for the purpose of umpiring was an excellent one. It was the general opinion of the National Guard officers that if this plan were still more extensive it would give the citizen soldiers the benefit of the experience of the officers who have made the art of war a study and profession.

The two weeks' experience was of great value to the State troops and should add greatly to the usefulness of the several organizations participating.

[First Lieut. H. R. FAY, commanding Company B, Seventh Regiment, National Guard California, Fort Winfield Scott, Battery Lancaster.]

Too much praise can not be given by the officers and men of Company B, to Captain Abbott, Lieutenant De Sombre, First Sergeant Hoop, Sergeants Kuntz, Lewis, and Schafer,

and the whole membership of the Sixty-sixth Company of Coast Artillery for their courteous treatment and attention. It was a pleasure for the officers and men to be associated with this Sixty-sixth Company and their willingness to instruct served in a great measure to aid Company B in maintaining, under new conditions, the efficiency and correctness always held by this command.

As suggestions are solicited I would recommend that owing to the aptitude shown by the men of this company for coast-artillery duties and their desire to continue in this service, that this regiment as a whole, owing to its well-known ability to be always relied upon, be transferred into that branch of the service.

Company B, located at the southern of the only two harbors in this State, should receive especial attention and instructions in coast defense.

I would recommend that arrangements be perfected whereby Company B can receive instruction at Fort Rosecrans at a time separate and in addition to the regular yearly encampment—say in December or January for a week or two—this tour of duty to be voluntary on the part of the members of Company B and all asked of the Government will be to supply rations for such period as the camp be called for.

Also that squads from Company B may visit and remain at Fort Rosecrans for instruction for a day whenever the same would be convenient to the commanding officer at the fort. This service to also be voluntary and there be no expense attached to the service whatever other than the mess.

[First Lieut. CHARLES C. BARNETT, Company C, Seventh Regiment, National Guard California, Fort Winfield Scott, Battery Cranston.]

This is the most instructive camp ever attended. The health of the men was of the best, only a few colds being noticed.

[First Lieut. JOHN KELLENBERGER, Company E, Seventh Regiment, National Guard California, Fort Winfield Scott.]

I have the honor to respectfully suggest the repetition of the maneuvers; also, if possible, to equip companies of the organized militia with copies of the artillery manual and also give them preliminary instruction at their respective home stations; also would suggest an increase of pay both in

the regular and organized militia army, thereby insuring more enlistments in the former as well as the latter and also a better attendance of the National Guard at those exercises.

I would also suggest the continuance of the varied lectures among the officers not only in camp but if possible at the home stations or brigade or regimental headquarters, thereby enabling them to impart knowledge to their respective companies.

[First Lieut. PETER J. CONLEY, Company F, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

I am very much pleased with the encampment and the men of my company are very much interested in the duties of coast-artillery service and we hope that the Government will continue to give us more practice.

By the Government doing so I know it will help in improving the National Guard in strength of companies and in many other ways.

The National Guard is very much interested in the coast-artillery service and the National Guard is anxious that the Government will continue to help it to become a strong helpful auxiliary to the United States Army.

Lectures which were given each afternoon were interesting and instructive and will be of much benefit to officers in future operations.

[First Lieut. A. P. HARRISON, Company I, Seventh Regiment, National Guard California, Fort Winfield Scott.]

We were assigned to the Tenth Company Coast Artillery Corps, and in most respects I was very much pleased with the way everything was conducted.

Having served nearly four years in coast artillery there was no novelty to the practice for me, but with my own previous experience felt that I could form a better idea by comparison than I could had I never served. It was very gratifying to note the way in which the militiamen took to the work and it was always surprising to note the rapidity in which they learned.

I would recommend that the encampments of militia with coast artillery be continued as often as possible and at least once a year.

That each company of militia be converted into an artillery company and assigned to a company of United States artillery.

[First Lieut. PAUL A. ADAMS, assistant surgeon, Seventh Infantry, National Guard California, Fort Winfield Scott, Cal.]

The journey north was uneventful and no sickness was reported.

Our daily work in camp consisted in caring for the sick and wounded of our regiment, inspecting and regulating the sanitation of our main camp and the camps of the companies of the Seventh Infantry stationed at the various batteries, and in accompanying the infantry acting as supports in their daily maneuvers.

In this work we were most ably helped and advised by Major Kiefer, surgeon, U. S. Army, who was detailed with us as inspector.

My personal contact with him was most enjoyable and I deem it a rare privilege to have worked with him.

There seems to have been no special arrangements made in these maneuvers for the training of hospital men in their work.

Anything that makes them more efficient makes for the welfare of the entire regiment and so I have hoped that in planning future camps a little more attention might be given to the development of the work of the medical department.

In closing I would refer to our contact with Colonel Lundeen, commanding officer of the Presidio, and the officers of the Regular Army associated with him. In every particular we found them most courteous and considerate and always ready to help us in our work.

[First Lieut. HARRY O. SLOTTERBECK, commanding First Company, Signal Corps, National Guard California, Fort Winfield Scott, Cal.]

Would say, as far as the Signal Corps is concerned, this camp was one of the most instructive and beneficial, as it required a greater range of work and we were obliged to carry it out under greater difficulties than in previous maneuver camps.

The cavalry buzzer and the use of rockets, bombs, and searchlight methods greatly simplifies night signaling, facilitates it and makes it more efficient.

The advanced methods of communication employed in the Regular Army and introduced to us by Lieutenant Abbott, Signal Corps, U. S. Army, and his noncommissioned-officer staff was extremely instructive to the organization, it being difficult to obtain a knowledge of the different instruments and systems used by the Regular Army on account of the insufficiency of the apparatus and the lack of time.

[Second Lieut. EDWARD L. BUTLER, Company D, Fifth Regiment, National Guard California, Battery Livingston, Fort Miley, Cal.]

The officers and noncommissioned officers of the post were always ready to assist the men in handling the guns and explain the duties of each man. The men worked with interest at all times.

The instructions we received from Captain Moore, Twentieth Infantry, U. S. Army, in battalion and extended-order maneuvers were very valuable both to officers and men.

[Second Lieut. C. M. STOUT, Company B, Fifth Regiment, National Guard California, with artillery reserves, Fort Baker, Cal.]

A great deal of thanks is due Lieut. W. T. Carpenter and the men of the Sixty-eighth Company for the care and trouble of explaining all details throughout the camp. The best relations existed between the men of both companies and it is the wish of each man, if these maneuvers are to be taken up again next year, to be assigned to Battery Kirby.

[Second Lieut. EDWARD L. BUTLER, Company D, Fifth Regiment, National Guard California, with artillery reserves, Fort Baker, Cal.]

The command entrained at 9.20 a. m. July 5th, arrived at Tiburon at 9.40, and remained there awaiting a boat till 1.45 p. m. Our travel ration was shared with Company E which had come unprepared for such delay.

On arrival at the camp site I found a detail of the Sixty-first Company ready to assist in setting up the field range and pitching the tents.

Immediately upon arrival I was met by a messenger from the post commissary asking for a detail to draw rations at once.

This is mentioned to show the extreme care taken by the post commander to insure the comfort of the visiting militia.

Upon summoning the quartermaster and the acting first sergeant for instruction in camp duties I found that they had already been taken in hand by the noncommissioned officers of the Sixty-first Company.

On succeeding days and on special occasions I noted that each man of Company D had a competent instructor ready at all times to assist him.

I attended all lectures delivered during the encampment and received most valuable instruction therefrom. I would suggest a more extended series of lectures and that each officer be required to pass an examination in the subjects covered.

The number of men in attendance at the encampment was very small.

This was partly due to the short time given the men to make the necessary arrangements for a vacation but principally on account of the fact that the rush season is on in midsummer. An encampment held in May or September would bring nearly double the number of men.

Another reason for the small attendance is that the memory of camp Atascadero still survives. There long forced marches and countermarches so exhausted the men and caused them such suffering that they dreaded a joint encampment. The exercises just completed have removed their fears in this regard. Although I made many inquiries I have not yet heard a single complaint from the militia of being overworked.

I would recommend that the several companies of National Guard California be assigned as supports and reserves on alternate days, thus keeping the men interested and giving them the instruction which they can not otherwise get in both artillery and infantry work.

The officers and men of the Regular Army at Fort Baker have, on all occasions which came under my observation,

shown every courtesy to the National Guard, have met them on an equal basis, and have never tired in answering their questions and giving them instruction.

In this connection I wish particularly to call attention to the untiring efforts and uniform courtesy of the Sixty-first Company, Coast Artillery Corps, Lieutenant Jones commanding, with which Company D was assigned. Such kindly feeling prevailing between the National Guard and the Regular Army will, without doubt, increase the attendance at future encampments.

[Second Lieut. CLAUDE H. SANBORN, Company E, Fifth Regiment, National Guard California, Fort Baker, Cal.]

Undoubtedly this is the most instructive and most enjoyable camp ever held by the National Guard of California and I think if we return next year we will have a full company.

I think the camp should be held about the last of August and to be not more than ten days' duration, as it has seemed too long and drawn out.

[Second Lieut. WILLIAM J. BRIGHT, Company C, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

This is the most instructive camp I ever attended.

The only suggestions I can make is that the State pay the men before leaving camp, as a great many of the men can not afford to attend the maneuvers on this account.

[Second Lieut. W. G. PACKARD, Company I, Seventh Regiment, National Guard California, Fort Winfield Scott, Cal.]

The artillery work was very interesting for both officers and men, but as a rule the officers of the National Guard are not qualified for such work.

I would not recommend changing the entire National Guard into coast artillery but would recommend reorganizing the guard into artillery and infantry reserve.

I would recommend a school be established for both men and officers to prepare themselves for artillery work.

STATE OF OREGON.

Artillery District of the Columbia.

[Date of exercises : July 6 to 20, 1907.]

COMMENTS OF REGULAR OFFICERS.

[Col. L. H. WALKER, Coast Artillery Corps, commanding officer, artillery district of the Columbia, Fort Stevens, Oreg.]

The regular drills and instruction commenced at 8.30 p. m., Monday the 8th, and continued until 8 a. m., Friday the 12th, when the period of simulated hostilities began.

Three hours daily, one and one-half hours in the forenoon and one and one-half hours in the afternoon, was prescribed for drills and instruction.

As a fact, however, the manning details or parts thereof spent a great part of each day at the instruments and guns, outside of the regular drill hours in practicing with the same, with the result that after a very few drills the details from the Oregon National Guard were able to replace the manning details from the regular garrison in a very satisfactory manner.

In this connection I have to state that the officers and men of the supports seemed to take much interest in the artillery work and it is believed would have preferred the artillery instruction.

The commanding officer, Fort Columbia, reports that the company of supports at his post voluntarily became a relief at the guns when not engaged in infantry duties.

As all the officers and men of the reserve companies were required for the manning details for the guns and station a detail of 21 enlisted men was made from the supports for instruction in submarine mining duties at Fort Stevens. The officer in charge reports that the result of such instruction was very satisfactory, that the detail under instruction was much interested and became quite proficient.

During the latter part of the drill period subcaliber practice was held with the mortar battery, the details from the Oregon National Guard being in charge. The results ob-

tained indicated that the State troops were quite proficient in their duties.

The result of such excellent camping arrangements and sanitation was that during the encampment there was practically not a case of sickness.

I have to report that the joint exercises in this district were perfectly successful in every way and developed the fact that the Oregon National Guard can be depended upon to supply efficient officers and manning details for the service of the armament of this district.

In fact, after two or three drills under the instruction of the regular officers, the officers and men of the militia were able to do fair work.

The Oregon National Guard seems to be composed of selected men, there being among them many civil engineers, electricians, and mechanics. I can sincerely state that in my long experience I have never known more faithful, energetic, or intelligent work than was done by them during this encampment.

They were quite enthusiastic during the whole time and their interest seemed to grow from beginning to end, and yet when they received orders to come for this duty, they state that they were very much discouraged.

It is believed that there was not a single case of disorderly conduct during the joint encampment.

I also have to invite attention to the excellent work done by the regular officers under my command.

They were energetic, kind, and patient in instructing the officers and men of the National Guard, and are responsible to a great extent for the interest and enthusiasm shown by them.

From the reports of the officers so far as they have been received at this date I have been unable to find any criticisms. They expressed themselves verbally as perfectly satisfied, only regretting that they did not have more time, and that the entire Third Regiment National Guard had not been sent to this encampment.

The programme of drill and exercises prepared previous to the encampment and approved by the War Department was satisfactory in every way and the same was practically followed during the encampment.

I would recommend that in future joint encampments the entire Third Regiment, Oregon National Guard, with the Third Separate Battalion be allowed to participate.

I would also recommend that a plotting room equipment be installed in a suitable place in Portland, Oreg., under the direction of the adjutant-general of Oregon.

[Maj. H. L. HAWTHORNE, Coast Artillery Corps, department artillery officer, Department of the Columbia.]

Based on the report of the artillery district commander it appears that the general Government can depend upon 7 companies of the Oregon National Guard to supply efficient officers and manning details for the service of the armament in the district of the Columbia. But such benefits, be they more or less, must attain the character of permanency before any sure reliance can be placed by the Federal Government on this means for coast defense. The benefits accruing to the Government by this year's joint exercises in this Department might therefore be stated as those flowing from an aroused interest among the militia authorities in the defense of our seacoast, through which they may be induced to a willingness to aid the coast artillery as a permanent reserve and support.

On the part of the militia the benefits received must have been those of a broadened view of their services to the State and particularly to the National Government. The knowledge that they have acquired new capabilities on which the Government believes it can rely, even in a partial way, will add to their self-reliance and military standing.

Among the lessons learned may be enumerated:

1. The presence in the militia of men skilled in certain scientific pursuits that fit them particularly for coast artillery work.

2. The disappearance among the personnel of the militia of their distaste for coast artillery work, based largely on the dread of its intricacy and difficulty.

3. A knowledge of the regular establishment as to how much reliance can be expected from militia aid in coast defense.

4. The need for permanent assignment of certain bodies of militia to particular units in the coast defenses, as reserves and supports.

5. The continuance of theoretical and practical instruction of the militia throughout the year at their armories, thus keeping alive their interest in artillery work and better preparing them for the annual joint exercises.

The only plan by which they can arrive at true excellence and efficiency, namely, the permanent assignment of certain militia organizations to the coast artillery reserve, in the duties of which they should be trained throughout the year as well as during the annual joint exercises.

[Comments of the department commander, Department of the Columbia, on the joint exercises.]

[First indorsement.]

HEADQUARTERS DEPARTMENT OF THE COLUMBIA,
Vancouver Barracks, Wash., Sept. 17, 1907.

1. Respectfully forwarded to The Adjutant-General, War Department.

2. The benefits derived appear to be more in the stimulation of interest than in any other direction.

3. It is believed that both the Regular Establishment and also the militia officers have learned to appreciate the importance of hearty cooperation and of mutual good will.

A. W. GREELEY,
Major-General, Commanding Department.

[Capt. F. W. PHISTERER, Coast Artillery Corps, commanding officer and fire commander, Fort Columbia, Wash.]

Both companies were able to provide themselves with cooked meals that evening and the messing arrangements were satisfactory throughout the encampment.

It is a matter of great pleasure to be able to report the extreme good feeling between the regular garrison and the militia stationed here. The interest and enthusiasm shown and the amount of hard work performed was a matter of congratulation for all concerned.

It is believed that greater good would result from a longer camp period for the artillery reserves and supports and that the camp period for the regular garrison be so arranged as to end with the departure of the militia. The captains of both militia companies expressed the opinion that they could bring practically as many men for two weeks as they did for

ten days. As none of the companies are likely to bring more than 50 men it is suggested that 4 companies instead of 2 be ordered to this post.

[Capt. H. G. BISHOP, Third Field Artillery, fire commander, Fort Stevens, Oreg.]

Practically a full relief for the personnel of my station was detailed from the National Guard companies. These men picked up their duties readily and in a remarkably short time were able to perform their individual duties with accuracy and to work together efficiently and satisfactorily. Lieut. Col. Poorman of the State troops was associated with me as relief fire commander.

RECOMMENDATIONS.

1. That the joint exercises be continued from year to year.
2. That an effort be made to organize some of the State troops as coast artillery; link each company so formed with a regular company in this district, provide them with plotting-room material to be set up in their armories, with telephones, quadrants, sights, etc., and arrange things so that regular officers and competent noncommissioned officers could visit, instruct, and inspect the work of the various details in their respective linked companies from time to time during the year. Also that militiamen of such companies be allowed to qualify as gunners before a board of regular officers convened annually and ones duly qualified issued the usual badge and insignia.

3. I would also suggest as a matter for consideration the passage of a law by which individual militiamen of each company could from time to time during the year join the regular company with which their own organization was linked and be mustered into the service for some stated period, say twenty days, for drill and duty in their respective positions on the manning table. There would thus be a constant flow of these men through the regular company during periods of nonemployment in their civil life. This could apply equally to National Guard officers. I talked of this and also of the formation of artillery companies with many of the State officers and found many who concurred in the idea.

4. That upon "call to arms," the battle commander give his instructions to each fire commander and make his assignment of targets immediately, i. e., without waiting for the fire commander to report "in order." Several times the entire fire command was delayed going into action during "run bys," once as much as five minutes, because one of the batteries was slow in being manned.

[Capt. P. WILLIS, Coast Artillery Corps, commanding Thirty-fourth Company, Coast Artillery Corps, Fort Stevens, Oreg.]

Officers and enlisted men showed a commendable interest in the work. Although little sleep was secured for two nights there was no complaint made.

As the city of Eugene is the home of the Oregon State University it is probable that the National Guard companies from that place contain a greater per cent of highly intelligent men in the ranks than can be found in most of the other cities of the State.

There seemed to be enough of these intelligent men in Company C, First Separate Battalion, which was a reserve for Battery Mishler, to fill all the more important posts satisfactorily after a few days' drill. It seems evident therefore that when the National Guard companies contain such men they can be made a very valuable asset to the coast defenses of the country in time of war. The experience of these maneuvers has demonstrated this fact conclusively.

[Capt. H. L. STEELE, Coast Artillery Corps, commanding Ninety-third Company, Coast Artillery Corps, and Battery Clark, Fort Stevens, Oreg.]

At first the regular detachment of range detail performed all the duties and by degrees the reserve detachment was substituted, until at last they were performing all the duties of the detail. At the emplacement the guns were manned as shown on manning table during the first part of this period and afterwards a mixed detachment made up from extra men and three guns of pit manned.

The exercises seemed to be successful in every respect and much interest shown by reserve company. Their work was excellent and too much praise can not be given for the will with which they went at it.

Capt. C. C. Hammond, Company A, First Separate Battalion, has a well-disciplined company and he did special good work in conducting subcaliber practice.

[First Lieut. BENJ. H. KERFOOT, Coast Artillery Corps, ordnance officer, Fort Stevens, Oreg.]

During the maneuvers there was considerable trouble at the batteries with drill primers failing to fire. At the batteries at which the trouble occurred the old drill primers were used.

The Thirty-third Company, Coast Artillery Corps, used the new drill primers and had the use of the new drill primer and resizing outfits and had little trouble except with the primers sticking, which cause seems to have been on account of the primer seats not being properly cleaned. This cause is assigned solely for the reason that this company had the use of the resizing outfit. It is hard to account for the troubles experienced by the other companies. It is believed, however, that the primers were not carefully assembled and that carelessness in handling the primer bodies accounts for most of the troubles. Some of the primer bodies that failed to fire were deformed, showing that the primers had been allowed at some time to fall on the gun platform or some other hard substance.

The post ordnance offices are now provided with the new drill primer and resizing outfits and the primers are loaded in these offices and it is believed that there will be little trouble in the future in the primers not firing.

[First Lieut. A. J. COOPER, Coast Artillery Corps, emplacement officer, Battery Clark, Fort Stevens, Oreg.]

Personnel: The men of the militia seemed to take to the work very cheerfully and readily, and at all times appeared congenial.

[First Lieut. EDWARD CANFIELD, Jr., Coast Artillery Corps, in charge of plotting room, Battery Mishler, Fort Stevens, Oreg.]

The militia detail learned their duties during four drill periods so as to be able to perform them quickly and accurately by alternately following the regular detail in the operation of the plotting board and correction boards. No effort during this time was made to cut the time of relocation and correction within the 20-second period. At the beginning of the period of actual hostilities it was found that they were able to perform all the operations of the plotting room and send the data to the guns within 16 seconds after the observing signal.

They plotted some very accurate courses during this instruction and compared very favorably in most respects, save as to quickness of operation, with the regular detail.

During the period of actual hostilities reliefs were detailed composed of both militiamen and the regular detachment and their work was highly satisfactory. The men of the Oregon National Guard who came under my direct observation during this period were above the average in intelligence, keenly interested in this work, attentive, and remarkably prompt in answering the "call to arms" at all times. From my experience in this encampment I should say that with these same men or ones of like capacity a period of ten days with a full complement of instructors would be all that is necessary to fit them to efficiently man the range detail in time of war.

[First Lieut. F. J. BEHR, Coast Artillery Corps, battery commander, Battery Jules Ord, Fort Columbia, Wash.]

The men who came to this post were very enthusiastic and desirous to learn all they could about this kind of work. They were very quick to pick up all the details of the different drills and every endeavor should be made to keep alive this interest so that the men may derive greater benefit from the maneuvers of the coming year.

[Master Electrician WILLIAM E. MAPES, Coast Artillery Corps, mine fire commander, Fort Stevens, Oreg.]

The standard of intelligence, aptitude, and interest noticed in general among these men was very high. I believe that in the event of war these men would render valuable service after preliminary instructions for a short time. The majority of the men composing my detail were men of technical training, various professions, and trades.

All men on duty under me obeyed orders promptly and harmony and good feeling existed among all.

[Electrician Sergeant LEE A. BERRY, First class, Coast Artillery Corps, assistant to mine commander, Fort Stevens, Oreg.]

The members of the militia detachment assigned for this work were highly intelligent, industrious, and showed a great interest for the work. They readily acquired a working knowledge of submarine mining.

Due to the limited time this knowledge was limited to a general and not a detailed understanding of the subject, but

the fact was strongly established that these men with a little training could render valuable and intelligent service during actual war.

[Contract Surgeon GEO. B. TUTTLE, U. S. Army, Fort Columbia, Wash.]

Food supply and its preparation: Supply sufficient, well prepared.

INSTRUCTOR OF SUPPORTS.

[Capt. J. R. M. TAYLOR, Fourteenth Infantry, U. S. Army, Fort Stevens, Oreg.]

I do not think that either the officers or the men of the militia anticipated being interested in the work assigned them as a relief to the artillery, but when they saw the guns and had the system of maneuvering them explained to them the work appealed strongly to the mechanical tastes and training which is so common among the people of this country. What they had looked forward to as an irksome task became a pleasure. At Fort Columbia the company assigned as support applied for the privilege of extra drills with the guns and at Stevens many men of the support there volunteered for the same purpose. Men who were mechanics, steam and electric engineers, and draughtsmen and clerks at once saw that their skill in their daily work fitted them to at once find places at the guns, at the engines and mining casemates, and at the plotting boards and they keenly enjoyed applying their intelligence to the mastery of new machines and of new methods.

From what I saw I am convinced that it would be possible to form among the men of Portland and other cities of this State a body which might be called "Volunteer Artillery Reserve of the District of the Columbia" whose duty it would be at the outbreak of war to take post at the defenses at the mouth of the river.

With enlistment for a certain duty in the vicinity of their homes, which no one more than they are concerned in defending, this real objection would not obtain in enlisting for a war. It is well not to ask too much and to clearly stipulate the duties which are to be performed.

As for the infantry supports to the artillery station I believe that the proper sized command for each post should be ascertained, if it has not already been, for I do not sup-

pose that the general order on the subject is final, and that if possible National Guard companies should be assigned permanently to those stations. I think that with tact they will come to feel that their positions in the defense of the posts of their own States are as much theirs and part of their lives as are their armories.

Although the force under my inspection was very small, I consider it well instructed for the essential purposes of war and that the officers and men were intelligent, alert, and willing. They and other men like them would be of most material aid in defending these works in case of war.

[First Lieut. R. I. REES, Third Infantry, U. S. Army, Fort Columbia, Wash.]

I was strongly impressed by the interest, energy, and enthusiasm shown by both officers and men of the National Guard companies in the performance of their duties.

I am of the opinion that the maneuvers just completed have been very beneficial to the National Guard. From the expressions of officers and men the duties performed by them as reserves and artillery supports have been far more interesting to them than the ordinary maneuvers they have taken part in during previous years. It is a matter of personal interest to know that if the country were ever involved in war they will have learned the duties required in the defense of the coasts of their own States and as a consequence protect their own homes.

COMMENTS OF MILITIA OFFICERS.

[Lieut. Col. J. M. POORMAN, commanding Third Infantry, Oregon National Guard.]

The health of the camp was perfect, not a single case reported at sick call. The camp was an open one, but not a single case of drunkenness was reported to me and not a man was reported for any breach of discipline. I believe all tried to merit his (district commander) approbation by attention to duty.

I think that the Guard received more beneficial instruction at this camp than at any previous, and with annual instructions along the same lines for at least fifteen days each year would become an important and very valuable assistant in time of war.

The tour should be longer and if possible twice a year.

Men filling the important stations in the towers should receive higher wages than is now paid and be relieved from manual duty. It would be well for this State to organize one or more companies of coast artillery.

The whole regiment should have been sent to Fort Stevens for instruction.

When the order was issued for duty at Fort Stevens some of the men were not pleased, but every man that I heard say anything about duty said he hoped that we would be sent back again next year. I did not hear a single complaint.

Officers and men were loud in their praise of the treatment received from officers at the post.

[Capt. CREED C. HAMMOND, commanding Company A, First Separate Battalion, Infantry, Oregon National Guard, Fort Stevens, Oreg.]

Our camp was an ideal one in every respect. The sanitary conditions were excellent under the frequent inspections of the post surgeon. The quartermaster and commissary departments made prompt issues, and all stores were in splendid condition; they were especially solicitous of our welfare and comfort at all times.

The faithful and persisting work of Captain Steele, Lieutenant Cooper, and their men in instruction interested the company thoroughly; that their desire for knowledge soon enlisted the personal interest of the entire command to the extent that both organizations failed to observe recall when sounded.

The only obstacle or difficulty encountered was lack of knowledge at first, for the average infantryman is just about as familiar with coast artillery as the uninformed citizen. At first glance the work appeared like a hopeless task or else it would require weeks to learn the technical terms, intricacies of mechanism, and the principles of solution and operation. It is not necessary for me to attempt to give a description of the service of the equipment in the various batteries, or speak of the temporary installation of the fire-control system or of the nomenclature of the pieces composing the armament, as the time allotted at this camp was too brief to gain the necessary information. But, thanks to the efficient and untiring efforts of Captain Steele and his company, we were

soon given an insight and a point to work on, and as we advanced step by step our desire for more knowledge constantly increased until we were entirely carried away with this most interesting and instructive work.

The idea of duplicating the Ninety-third Company, from battery commander down, was of inestimable value to my company. Each officer and man taking a personal interest in the welfare and instruction of his duplicate reserve and the prompt and apt response of the reserve served to call forth even greater attention on the part of the regular instructor, which worked for the mutual benefit of all. Especially good were the lessons in discipline and military courtesy, as these are sometimes slighted in militia organizations. The constant association of my men with Captain Steele's men taught my men to be observant and to render proper respect to superiors at all times. The contact helped them in many ways to learn the customs of the service.

Captain Steele's kindly treatment and liberal consideration for his company's welfare in sport, pleasure, and comfort, aside from his zealous interest in their efficiency, were the cause of much satisfaction to me and I could see that it readily impressed my men with a very favorable opinion of the Army. Recognize the man and his ability to do his duty. The individual head is one of the salient points of American soldiery and every officer who regards the efficiency and support of his men must recognize this fact. The volunteer expects this recognition. This is peculiarly so in the coast artillery, where each man appears to be a unit and all is individual work, so vastly different from the infantry where a squad or a company would act as a unit. This has impressed the militia with the fact that they would get better consideration and more opportunity in the coast artillery than in the infantry and would get more recruits were it generally known.

Another excellent instruction was the detail of the militia to do post guard duty with the regular troops, for this in my experience is our weakest point. I am further of the opinion that the greatest benefit the militia could receive would be to detail a number of companies with a like number of regular companies to do duty in a garrison for a few weeks each year, where they would have to perform all duties

required of the regular troops under the supervision of the post officers and men. This system of duplication in camp and garrison would make soldiers for volunteers quicker and cheaper than all other means. The militia needs the individual instruction.

It is a pleasure to acknowledge my high appreciation to Colonel Walker for his instructive talks, wholesome advice, and deep interest manifested on all occasions. Such respect and treatment is indeed very encouraging to officers of the militia.

The quartermaster and subsistence departments were exceedingly well conducted in connection with our welfare and were very accommodating in their excellent service. The rations were exceptionally good and the sanitary conditions being almost perfect together combined to make it a most healthful camp, as attested by the fact of the company not having a single man reported sick during the camp.

Lastly, I wish to express my sincere gratitude to Captain Steele and his company for their patience, perseverance, and kindly assistance in addition to the thorough instructions and soldierly examples, all of which have been extremely beneficial and will have lasting results in my company's efficiency record and future work. Arriving as a company of recruits at this work, it required the utmost tact on the part of Captain Steele, as a reviver of interest, to awaken us from our indifference and to get such splendid results in so short a period.

In closing this narrative of the duties, observations, and impressions learned I do not hesitate to say that this tour of duty has been unquestionably the most valuable training the company has received in a joint army-militia maneuver. Great good will result from this camp with the coast artillery at Fort Stevens, as the militia will go back into civil life and meet thousands of people who will be interested in hearing their observations and in learning the absolute necessity of greater preparation for the national defense. The people must be educated as to the true conditions and then Congress will see the necessity when the public demands action.

The very best of good feeling and absolute harmony prevailed at all times between the regulars and militia and this

joint maneuver served to bring them still closer together, as they must necessarily be in time of war or danger to the nation.

[Capt. JOHN M. WILLIAMS, commanding Company C, First Separate Battalion Infantry, Oregon National Guard, Fort Stevens, Oreg.]

During the afternoon of July 7 the manning parties were made up and on the morning of the 8th we reported for duty and instruction. We were at the time in total ignorance of the duties to which we had been assigned, even a "manning table" was something strange and foreign to us, but after a moment's explanation we were able to make one out, which, with but a slight change, remained as the manning table for our tour of duty. The manner of falling-in the company was also strange, but after a moment's study of the drill regulations (which we borrowed from the members of the Thirty-fourth Company, Coast Artillery Corps) it was all plain.

Among the members of the company were about a dozen students of engineering from the University of Oregon, both civil and electrical, and as they were familiar with instruments of the nature of those in the observing stations and plotting rooms we had but little trouble in obtaining men from the company to handle the instruments.

Captain Willis, commanding the Thirty-fourth Company, Coast Artillery Corps, and his officers and men gave the company very efficient instruction and treated us kindly and courteously. The men improved rapidly under the instruction and after a few hours' instruction were able to perform their duties with some degree of accuracy, though much slower than the members of the regular battery. Every man took a keen interest in his work and owing to the short time the tour of duty was to continue improved the time to the best advantage in learning his duties. The company is largely made up of educated men and students of the Eugene High School, University of Oregon, and the Eugene Business College and the work assigned to us was intensely interesting to them. It is my impression that were the company assigned to such duties every year it would attract to it a larger proportion of such men, especially the students of engineering. I feel I am fully warranted in saying this

from the expression of opinions from the men on the opportunity to handle the instruments and machinery and the efficient instruction received.

When hostilities were deemed to have commenced the men were always on the alert and responded promptly to every call to arms. In fact whenever there was a likelihood of there being a call to arms they repaired to their stations to be in readiness for it.

In conclusion I will say that it is my impression that were it necessary the company could in a remarkably short time be able to handle a battery, though we might be somewhat deficient in repairing instruments or machinery should either get out of order.

[Capt. WALTER W. WILSON, Third Infantry, Oregon National Guard, assistant fire commander, Fort Columbia, Wash.]

I would recommend that the State of Oregon be encouraged to organize two companies of coast artillery and that the necessary equipment be purchased and placed in their respective armories for drill purposes so that at the annual encampment each year said companies could be assigned to some fort for target practice.

[Capt. SAMUEL WHITE, commanding Company A, Third Infantry, Oregon National Guard, Fort Stevens, Oreg.]

While my company was not actively engaged in handling the coast guns they all became quite generally familiar with the work by constant observation when not on duty with their own line of work.

The best of feeling prevailed at all times between the regular forces and the Guard and every courtesy was extended.

The officers and enlisted men of the Regular Army took great pains and care in the instruction of the officers and enlisted men of the Guard in the various duties assigned them and it is my opinion that the results of this encampment will be of incalculable benefit to the Guard.

I have no recommendations to make except that a continuation of this work for a few years would be of a most beneficial source of information to the National Guard. I would respectfully suggest that at all future encampments the time limit should be extended to not less than two weeks and that

all of the National Guard of Oregon be given the benefit of coast-defense instruction.

[Capt. WALTER W. WILSON, commanding Company B, Third Infantry, Oregon National Guard, Fort Columbia, Wash.]

Being commanding officer of Company B, Third Infantry, Oregon National Guard, I was surprised to note the interest taken and work accomplished by the men in this line of duty, which is entirely different from that to which they have been accustomed.

These men after four days' drill were able to take entire control of the gun and different stations to which they were assigned.

I would recommend that the necessary equipment for a range section be purchased and placed at the armory at Portland, Oreg., for the benefit of the companies there stationed and that at its next annual encampment this company be assigned to duty as coast artillery reserves.

[Capt. LOREN A. BOWMAN, commanding Company C, Third Infantry, Oregon National Guard, Fort Stevens, Oreg.]

Comment upon the observance of the routine, efficiency, and aptitude I will leave to officers of the regular service, confining myself to a few matters viewed from the standpoint of a militiaman.

The instruction embraced battle exercises, forming outposts, patrolling, and road and outpost sketching. Captains Taylor, Herron, and Allison, of the regular Army, were painstaking and patient in performing the duties of instructors, and I only regret that the drills were too short. Time taken up in going to and coming from the exercise grounds left not enough for instruction.

Both officers and men were much interested in the problems of coast defense and were favorably impressed with this line of work for the organized militia. Should it become the fixed policy to train militia for the service of seacoast defense I think the companies to be employed in serving the guns should be permanently assigned to that service and recruited accordingly.

This report would be incomplete without some expression of appreciation of the many courtesies extended and of the consideration and patience displayed on the part of both

officers and men of the Regular Army in all our relations with them, which served to make these exercises the most pleasant as well as one of the most instructive I ever engaged in.

[Capt. CHAS. A. MURPHY, commanding Company M, Third Infantry, Oregon National Guard, Fort Columbia, Wash.]

In conclusion I can not say too much for the kindness of Capt. Frederick W. Phisterer, commanding the post, First Lieut. Francis J. Behr, adjutant, and First Lieut. Robert I. Rees, Third Infantry, U. S. Army, who was detailed as special instructor to the infantry supports. He was always ready to aid us in every way possible, and at the completion of every drill or maneuver he kindly pointed out our mistakes and gave us the benefit of his complete mastery of military subjects relating to infantry, and from time to time instructed the enlisted men in soldierly bearing and general conduct as soldiers.

The officers and men of Company M leave for home with the greatest respect and regard for the above-mentioned officers, who have done everything in their power to make our stay pleasant and instructive, oftentimes, I know, going out of their way to give us additional aid and instructions.

The kindly manner in which it was done being doubly appreciated, as we know that the fact of our being here made them a large amount of additional work.

[Capt. F. C. BROSIUS, assistant surgeon, Third Infantry, Oregon National Guard.]

The only observation necessary as to health of officers and men is the record of not one case of sickness in command averaging 207 officers and men for ten days, and only 4 men relieved from duty, including 2 cases of boils, 1 of bruised arm from base-ball game, and 1 accidental fall from a parapet. No serious results. All cases returned to duty, cured, before leaving camp.

[First Lieut. WILLARD F. DAUGHERTY, Third Infantry, Oregon National Guard, battery officer, Battery Jules Ord, Fort Columbia, Wash.]

In pursuance of my duties in this capacity I must say that the work done by the men of Company B was highly satisfactory and with a little more training the men could do the work as artillery reserves in case of war, and I am of the opinion that the men could do the work with safety in firing heavy charges.

STATE OF WASHINGTON.

Artillery District of Puget Sound.

[Date of exercises: July 4 to 13.]

COMMENTS OF REGULAR OFFICERS.

[Col. ALBERT S. CUMMINS, Coast Artillery Corps, commanding Artillery District of Puget Sound, Fort Worden, Wash.]

The exercises were both interesting and instructive to all concerned and it is believed they were as successful as could be expected under the existing conditions.

The work and conduct of the Washington National Guard throughout the exercises were most commendable. Both officers and enlisted men are deserving of great praise for their excellent showing during the entire period of the encampment. Everywhere were evidences of good discipline, attention to duty, great interest in their work, and a strong desire to profit by their opportunities to learn.

So far as I could ascertain there was not a case of sickness nor an infraction of discipline in the command during the encampment. Colonel Lamping is to be congratulated upon the showing made by his regiment.

The best of feeling existed between the two services and I believe both were benefited by being brought into closer official contact with each other.

RECOMMENDATIONS.

That the Pay Department supply extra blank forms for muster and payrolls for the militia and that a brief model with full instructions be supplied as to their preparation.

That if practicable the same militia organizations be assigned for duty in this district during future exercises and that a larger force attend to better illustrate the work of the artillery supports.

That steps be taken to give the militia and officers theoretical instruction on artillery subjects during a portion of the year when they are not in camp.

That special inducements be offered the younger officers of the militia to perfect themselves in the technical parts of the

subject of artillery especially; that they be encouraged to take the courses at the service schools at Forts Monroe and Totten.

[Maj. GEO. T. BARTLETT, Coast Artillery Corps, commanding Fort Flagler, Wash.]

A commendable interest in the exercises was shown by officers and enlisted men and their conduct toward the militia, both official and social, was particularly gratifying.

All officers and enlisted men (militia) manifested a lively interest in the work assigned them and made rapid progress in learning the gun drills and position-finding service. During their subcaliber service they furnished complete range sections which were fairly efficient at the gun batteries without assistance from the regulars; the range section at the mortar battery required more assistance.

It is believed that it will be more satisfactory in future to both regular troops and militia if the latter are, where practicable, assigned to batteries out of service, with officers and noncommissioned officers of the regular troops to instruct and guard against damage to material from improper use.

[Maj. MORRIS K. BARROLL, Coast Artillery Corps.]

Suggests that National Guard organizations intending to camp here be designated a year in advance, and that they be assigned to batteries, that they be furnished in their armories during the winter the material to operate a plotting room for instruction purposes and that their instruction be given by a regular officer or noncommissioned officer.

[Maj. H. L. HAWTHORNE, Coast Artillery Corps, department artillery officer, Department of the Columbia.]

Based on the reports of the artillery district commander (artillery district of Puget Sound), it appears that the Second Regiment of the Washington National Guard is as satisfactory and as successful as could be expected under the existing conditions. But such benefits, be they more or less, must attain the character of permanency before any sure reliance can be placed by the Federal Government on this means for coast defense. The benefits accruing to the Government by this year's joint exercises in this Department might therefore be stated as those flowing from an aroused

interest among the militia authorities in the defense of our seacoast, through which they may be induced to a willingness to aid the Coast Artillery as a permanent reserve and support.

On the part of the militia the benefits received must have been those of a broadened view of their services to the State and particularly to the National Government. The knowledge that they have acquired new capabilities on which the Government believes it can rely, even in a partial way, will add to their self-reliance and military standing.

Among the lessons learned may be enumerated:

1. The presence in the militia * * * of men skilled in certain scientific pursuits that fit them particularly for coast artillery work.

2. The disappearance among the personnel of the militia of their distaste for coast artillery work, based largely on the dread of its intricacy and difficulty.

3. A knowledge of the regular establishment as to how much reliance can be expected from militia aid in coast defense.

4. The need for permanent assignment of certain bodies of militia to particular units in the coast defenses as reserves and supports.

5. The continuance of theoretical and practical instruction of the militia throughout the year at their armories, thus keeping alive their interest in artillery work and better preparing them for the annual joint exercises.

The only plan by which they can arrive at true excellence and efficiency, namely, the permanent assignment of certain militia organizations to the coast artillery reserve, in the duties of which they should be trained throughout the year as well as during the annual joint exercises.

[Comments of the department commander, Department of the Columbia, on the joint exercises.]

[First indorsement.]

HEADQUARTERS DEPARTMENT OF THE COLUMBIA,
Vancouver Barracks, Wash., September 17, 1907.

1. Respectfully forwarded to The Adjutant-General, War Department.

2. The benefits derived appear to be more in the stimulation of interest than in any other direction.

3. It is believed that both the regular establishment and also the militia officers have learned to appreciate the importance of hearty cooperation and of mutual good will.

A. W. GREELY,
Major-General, Commanding Department.

[Capt. B. C. GILBERT, Coast Artillery Corps, commanding Fort Casey, Wash.]

Now that the Second Regiment, National Guard of Washington, is more conversant with the needs of the Coast Artillery, I would suggest that the same regiment be sent to this district at the next exercises, but that the regiment be sent here more for the purpose of performing its duties as infantry supports.

[Capt. J. A. RUGGLES, Coast Artillery Corps.]

It is recommended that the militia be assigned to batteries not in commission in the future, if practicable, and that they be given an allowance of ammunition for service if possible.

[Capt. KENNETH C. MASTELLER, Coast Artillery Corps.]

An instance of the interest of the officers and men of Company B (militia) in artillery work and showing their desire to learn all they could is the following which occurred upon their second day of actual artillery work. After an hour and a half's drill and instruction in the morning and two full hours' drill and instruction in the afternoon the captain assembled his company after supper and took them to the gun for another hour's work. This as well as most of the afternoon drill was spent in working for a rapid ammunition service and in instructing the men in their duties as different numbers of the gun detachment.

One detachment loaded No. 3 gun with dummy ammunition during the afternoon drill first mentioned in forty-one and two-fifths seconds.

[Capt. HARRY W. NEWTON, Coast Artillery Corps.]

The men (militia) in A pit of Company K were very enthusiastic and really became very proficient in a very short time, so that by the end of the week a detachment composed entirely of the guards loaded with dummy projectile, set in azimuth and elevation one of the mortars in thirty-three seconds and did so a number of times in succession. During

the subcaliber firing the members of the guard did some very good shooting. The greatest of interest was shown by them in their work. They could be found at all times as well as drill hours in the pit and about the works being instructed or practicing what they had been taught, and here I must speak of the willingness with which the noncommissioned officers and men of our troops affiliated with and endeavored to instruct the guardsmen at all times.

[Capt. RUSSELL P. REEDER, Coast Artillery Corps.]

It is believed that much trouble would be avoided if the Adjutant-General's Department and the Pay Department would supply each organization with model forms of the several blanks that militia are required to render while in the pay of the United States. Owing to the difference in form of their returns and papers required by the State and those required by the United States much confusion arises and by supplying model forms it is believed that this confusion would be overcome.

It is believed that it would be of advantage to the militia and would keep up the interest in the work if a number of officers and men could be invited to be present on each occasion of service target practice. The officers and men of the militia showed great enthusiasm and interest in coast-defense work and it is believed that with a small amount of encouragement a most efficient reserve coast artillery corps could be organized.

It is believed that excellent results could be obtained if officers were detailed each month to deliver lectures to the several militia organizations whose home stations are on Puget Sound, and every effort should be made to encourage and train these men so they can go at once to the batteries they have been assigned to, being linked with the company with which they have been paired.

[Capt. H. W. BUTNER, Second Regiment, Field Artillery.]

From start to finish the National Guard troops seemed to be interested in their work and a great number of their officers expressed themselves as being well pleased with the results of the encampment.

At a post like Fort Flagler I believe it would be better if the National Guard could be assigned to the batteries out of commission and give them an allowance of service ammunition for practice.

[First Lieut. W. W. K. HAMILTON, Coast Artillery Corps.]

One feature of the encampment which impressed me as being especially noteworthy, and which to my mind furnishes an indisputable argument in favor of a continuance of these exercises, was the work of the militiamen of Company M, Second Regiment, Washington National Guard, who formed a range section at Battery Paul Revere. This work demonstrated conclusively the feasibility of forming an efficient range section composed of selected militiamen in comparatively short time.

The section was carefully selected, most of the members possessing technical educations which fitted them for the work.

[First Lieut. JULIUS C. PETERSON, Coast Artillery Corps.]

Both officers and men of the company of the National Guard assigned to pit B took great interest in the work, which they did with enthusiasm. The men of the militia and those of the One hundred and eighth Company, Coast Artillery Corps, assigned to this pit, worked well together and no lack of harmony was observed at any time.

[First Lieut. JOHN C. OHNSTAD, Coast Artillery Corps.]

As far as the mechanical operation of the guns is concerned the National Guard of the State of Washington, showed a great interest and operated the guns very satisfactorily. But in order to get any satisfactory work out of them it will be necessary to equip them or allow them access to same and to assign instructors to them before they arrive at the forts for encampments.

INSTRUCTORS OF SUPPORTS.

[Maj. JOHN S. PARKE, Jr., Fourteenth Infantry, U. S. Army.]

I am of the opinion that the instruction given is of great value to all concerned and have no suggestions to make for its improvement, unless it be the assembling of a larger force at the next maneuvers.

[Maj. E. H. PLUMMER, Third Infantry, U. S. Army.]

All duties of the National Guard that came under my supervision were performed in a very satisfactory manner and it is believed that both officers and enlisted men of the guard took advantage of the opportunities offered to learn as much as possible.

It is suggested that guard duty be performed by the infantry, leaving all artillery available to man the guns.

COMMENTS OF MILITIA OFFICERS.

[Col. GEO. B. LAMPLING, commanding Second Infantry, National Guard Washington.]

Inasmuch as I was stationed at Fort Worden during this entire tour of duty, I shall confine my report in general to the benefit to be derived and the practicability of making the National Guard regiments or militia, particularly in the seacoast States, as nearly as possible an efficient arm or reserve of the Coast Artillery, leaving the details of the knowledge gained to the reports of the various battalion and company commanders.

This regiment has had two previous tours of duty in maneuver camps as infantry, viz, in 1904 and 1906 in the joint maneuvers with the Regular Army at American Lake in this State. When this regiment was ordered by the governor of this State, through and by the request of the War Department, to take our tour of duty this year with the Coast Artillery Corps, officers and men of the regiment were very much discouraged and chagrined, inasmuch as they knew absolutely nothing concerning Coast Artillery work, as for a number of years they had educated themselves in infantry duties. Our enlisted strength failed to attend camp as in previous maneuver camps, because the men failed or made no effort to get off from their various employments, because the maneuver camp was of no interest to them, so consequently the regiment entered upon this tour of duty very much handicapped.

I myself as commanding officer of this regiment was very adverse when it was first proposed to go on this tour of duty, but to the surprise of both officers and men at the end of our ten days encampment they returned to their various home

towns, as a rule thoroughly enthused and enthusiastic and interested in this Coast Artillery work.

Before the officers in the volunteer service could properly perform the duties of their respective grades, I believe it would be necessary for them to take up a regular course of study under officers of the Coast Artillery service in their home stations and think it would be entirely practicable for the United States Government to organize, drill, and instruct the National Guard troops in the coast States in this work. It was apparent to me on this tour of duty that the men very quickly became accustomed to their duties and became quite proficient in the handling of the guns and mortars. The officers were also very much interested in the work and learned a great deal; however, it was apparent to me that it would be absolutely impossible for the officers to handle men or guns in the various stations without a thorough course in the same. Being situated, as the greater proportion of the regiment of this State is, practically upon the shores of Puget Sound, the officers and men could be assigned as a reserve of the United States troops to the various forts protecting this inland sea, and could also become very proficient under proper instructions at their armories in such duties as range finding, plotting, searchlight work, maneuvering, and firing of the guns. The ordinary National Guard officer, outside of his civil life, has all of his time taken up in making himself proficient in infantry work without going into the science and intricacies of the artillery branch. For the National Government to make practical a scheme to educate and drill National Guard troops as a reserve it would be necessary in my opinion that after officers and men have arrived at and attained a certain degree of proficiency under Government inspection, they should be allowed and paid, outside of their State allowance and pay, certain salaries according to their rank.

The War Department could reward, which I believe entirely practicable, a National Guard regiment which had attained a certain degree of proficiency under inspection by designating it as a reserve artillery regiment. This plan would not conflict in any way with the State duties of these National Guard regiments. Inasmuch as the more proficient they became with the aid of the National Government in

Coast Artillery work, the more efficient they would be as infantry for State purposes. The Government could very easily, in my opinion, as taking for example this Puget Sound country, take the Second Infantry Regiment, National Guard Washington, and pay officers and men a certain percentage of the Regular Army officers' and men's pay. Say for example that the artillery reserve regiment, so designated by the War Department, would receive 10 or 15 per cent per year of officers and men of like grades in the regular service.

The experience gained by the officers of my regiment in this last Coast Artillery camp has certainly been very valuable and interesting to them, and all of them have realized that with some kind of a practical plan as I have roughly outlined the efficiency of the National Guard would be increased 1,000 per cent as State troops and that they would also become a real and practical reserve force of the United States Army, as the laws of this country have always contemplated. My experience in the Coast Artillery work has been so limited that it is impossible for me to even suggest any improvement to the efficient officers of that service in their own branch.

In conclusion, I sincerely hope that it will be my good fortune and likewise of the officers and men of this regiment, to serve some time in the future with the efficient and competent officers we served under in the last camp.

[Maj. OTTO A. CASE, commanding First Battalion, Second Regiment, National Guard Washington.]

I would recommend that a certain portion of time be allotted the National Guard of this State for infantry work, such as company and battalion drills, etc., and that battalion commissary officers and noncommissioned officers should be exercised in their work.

My observance however of the good work done by the companies leads me to the belief that it is advantageous for the general Government and the State government to carry out this work and that the National Guard of this State is especially adapted to the work of coast defense.

In conclusion, I desire to say that I believe an independent battalion of coast defense artillery should be organized, 2 companies stationed at Seattle, 1 at Tacoma, Bellingham, or Everett, and that the battalion with the Second Infantry

could work together, the artillery companies assigned to the guns and the infantry to the land defenses and that the Second Infantry be allotted a portion of its time to infantry work.

[Comments of district commander Col. A. S. CUMMINS, Coast Artillery Corps, on Major Case's report.]

Evidently Major Case does not understand that the company has been adopted as the unit in coast artillery and that regimental organization finds no place there.

Where an officer's entire military service has been with the regimental form of organization it is not surprising that he should find difficulty in suddenly abandoning it.

[Maj. W. L. LEMON, commanding Second Battalion, Second Regiment, National Guard Washington.]

From an artillery standpoint I am of the opinion the joint encampment was a decided success, as it proved quite conclusively that such men as make up the enlisted strength of the National Guard of Washington, under proper instructions, within a reasonable length of time, are capable of rendering valuable assistance to the Coast Artillery.

The utterly unprepared condition of the forts in this district in the event of hostilities must be apparent to all, especially so far as the enlisted strength is concerned; therefore the knowledge of the fact that men with some previous military training can be prepared in a short time to assist very materially in this branch of the service is of very great importance to the Department and to the Coast Artillery.

From an infantry standpoint I am of the opinion that very little benefit was derived from this tour of duty further than to give the officers and men some knowledge of camp life and the topography of the country adjacent to the forts.

Much interest was manifested by all, yet all infantry drill was suspended during camp and all were trained in the work of the Coast Artillery, which in my opinion would be very desirable if we were an artillery organization, but being an infantry regiment, and being able to assemble the entire regiment but once a year, it is my belief that some instructions should be had in that branch of the service, so that in the event of our being called upon we may enter upon our duties with some knowledge of the requirements of that branch of the service to which we properly belong.

[Maj. JOHN STRINGER, commanding Third Battalion, Second Regiment, National Guard Washington.]

The officers and men took to the work with the keenest interest, always endeavoring to get the best possible results from the time which they had to learn the Coast Artillery work.

On the whole I think that the camp was very profitable to the Guard.

As to future maneuvers and problems I would suggest that landing parties be landed at Discovery Bay and on the west side of Whidby Island and our regiment be sent to repel this attacking party, giving our regiment a problem of two nights' camp with shelter tents and a march of 10 or 15 miles.

The regular force stationed at Fort Flagler is about one-third of one relief, and in case of war these troops would have to remain on duty constantly day and night. I think it wise to call to the attention of our Representatives in Congress the need of more men to man these forts and also that more ammunition, powder, and shot be supplied them, as from my observation there was not enough ammunition to last fifteen minutes in case of actual hostilities.

I think that the Government acted wisely in sending us to these forts, as in the case of a sudden attack upon our coast we would be able to do good work in assisting the forts to repel the attack while a nucleus of our officers and noncommissioned officers could be put to mustering another regiment or two of infantry that could be used in a short space of time to repel any enemy marching upon these forts from the rear.

[Capt. CHAS. E. HEAD, adjutant, Second Regiment, National Guard Washington.]

I think this encampment has proven a great benefit to our State troops and probably to the regular establishment, to a certain extent, and hope that at another time a like opportunity may be presented for such cooperation.

[Capt. W. M. INGLIS, Second Regiment, National Guard Washington.]

A very pleasing feature of the joint encampment was the splendid feeling that existed between the enlisted men of the regular service and the guardsmen.

There is no doubt in my mind that the guardsmen are adaptable to this branch of the service.

In conclusion, I would add that I believe the infantry should not be used for this purpose, but that separate National Guard organizations should be provided to act as coast defense reserves, who would make a special study of coast defenses and all the various ways and means of operating them.

[Capt. C. S. SAPP, Second Regiment, National Guard Washington.]

To my mind I do not think that a more profitable encampment could have been held than the one just held in the artillery district of Puget Sound. It filled a long-felt want and served to reunite the guard and once more place it on its feet.

The encampment at Fort Casey did more to bring my command together than any joint encampment that we ever attended. In future exercises of this character I think that we should try and make the work of such a character that it would draw more of our young men into the National Guard.

I wish to express my appreciation for the kindness shown myself and my command on my arrival at Fort Casey.

[Capt. D. W. CROW, Second Regiment, National Guard Washington.]

I was strongly impressed with the utter inadequacy and unpreparedness of Fort Casey and the other forts in the district in the event of war. They are garrisoned by about one-tenth of the strength necessary to handle the guns properly and they have absolutely no land defense.

There should be a considerable body of infantry within a short distance of these posts. Unfinished emplacements, carriages without guns, empty magazines, and a general condition of unpreparedness are evident on all sides.

The officers at these forts are doing the best they can with the limited garrisons and incomplete equipment and the fault is not with them. Steps should be taken to strengthen the garrisons very materially and the forts should be completed.

I feel certain that the tour just ended will prove more beneficial to our enlisted men than any previous camp.

[Capt. GEO. H. BAKER, Second Regiment, National Guard Washington.]

To the officers and members of Company K it was a very interesting and instructive camp and I would respectfully

suggest that we be sent there next year for at least two weeks and let us become more familiar with the work. The greatest defect that I noticed was that there are not men enough to properly man the fort; if we are to be recognized as a reserve for coast defense would suggest that we be furnished with coast guns to drill with.

Send us back there for camp is the sentiment of my entire command.

[First Lieut. H. A. HANSON, Second Regiment, National Guard Washington.]

Future exercises should be governed by the following conditions:

1. A systematic course of instruction suitable to the conditions should be outlined and conducted prior to the next exercise—

(a) For officers of the National Guard.

(b) For noncommissioned officers of the National Guard.

2. Artillery exercises should cover a period of two weeks' duration, should include both theoretical and practical instruction and should conclude with record target practice with service ammunition.

[Second Lieut. FRANK W. RADLEY, Second Regiment, National Guard Washington.]

The encampment as a whole was a great success and certainly a valuable experience for all who participated in it.

In case of war I think that the militia could be of great assistance to the Coast Artillery Corps. The companies should be sent to their respective batteries at the earliest possible moment, however, so that they would have an opportunity to do considerable drilling before being called into action.

I would suggest that the encampment for the National Guard of Washington as held this year be repeated in 1908. In such an event each company should be assigned to the same battery to which it was assigned at the recent encampment.

I would also recommend the addition of a Coast Artillery Corps to the National Guard of Washington. This could be done by organizing another battalion of infantry under the present law. This battalion could be drilled as coast artillery until the next session of the State legislature, at which time a law covering the case could be enacted.

[First Lieut. C. C. McCORMACK, assistant surgeon, Oregon National Guard,
Fort Columbia, Wash.]

Food was ample, of first-class quality, and well prepared.

[Second Lieut. GEO. H. SCHUMACHER, Third Infantry, Oregon National Guard,
battery officer, Battery Mishler, Fort Stevens, Oreg.]

The instruction had been so carefully given and the interest of the reserves so intense that at the end of the fourth day the reserves were able to load and fire the big 10-inch guns almost as rapidly as the men of the regular battery.

After hostilities were deemed to have commenced the regular battery men and the reserves were intermingled in the handling of the gun. During this time eight alarms were sounded and at call "to arms" the men responded promptly and were at the stations assigned to them as soon as the men of the battery and, so far as I could judge, did their work just as efficiently. A goodly proportion of the men under my command were educated men, and some of them students of engineering in the University of Oregon, and were specially fitted by their previous training for taking up readily the work to which they were assigned.

[Second Lieut. CLYDE T. SPOONER, Third Infantry, Oregon National Guard,
assistant to battery officer, Battery Jules Ord. Fort Columbia, Wash.]

In pursuance of my duties in this capacity I was impressed with the evident interest taken in the work by Company B, Third Infantry, Oregon National Guard, and with the progress made during the days of instruction and the manner in which they performed their duties during hostilities.

SMITHSONIAN INSTITUTION LIBRARIES



39083006096739